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REPORT ON OPERATION CHLORINE

Hugh B. Cottrell, et al

Public Health Service
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PUBLIC HEALTH SERVICE

REPORT ON

OPERATION CHLORINE

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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

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INTRODUCTION

Eighty thousand people were threatened with the peril of deadly gas. Plans were developed and implemented to protect the population during the emergency. This was not an easy task. Problems were encountered and had to be solved. Since similar problems will arise during any major emergency involving large groups of people, this report may be useful for emergency planning for future disaster operations.

This report depicts the largest emergency program of this kind our nation has ever seen. The outstanding cooperation among the Federal, State and local officials, the voluntary organizations, and above all, the individual, was exemplary.

All individuals involved in Operation Chlorine can feel justly proud of working together to bring a difficult task to a successful completion.

HISTORY OF ACCIDENT AND ACTIVITIES LEADING UP TO ASSIGNMENT OF DELEGATIONS

At 6:45 a.m. on March 23, 1961, in relatively clear weather, the towboat EASTERN of the Union Barge Lines, with a tow of 16 barges, was upbound on the Mississippi River in the vicinity of Morville, Louisiana, 7½ miles below the Natchez City Front Landing. Upon reaching Morville Landing, the barge encountered a particularly swift current.

On the port bow of the tow was the new barge, WYCHEM 112, on its maiden voyage - an open-deck craft with four huge steel tanks in its hold, riding low in the water with its heavy load of 1100 tons of liquid chlorine. (Figure 1 shows the sister barge of the WYCHEM 112). In a strong current, the bow of the barge submerged, snapping the lines lashing it to the other barges. The barge sank immediately. Ultimately it was determined that the barge had come to rest at the bottom of the Mississippi River, broken amidship. (See Appendix IV - Calendar of Events Leading Up To Operation Chlorine.)

As long as the steel tanks lay undisturbed and held firm without leaks there was no immediate danger; but leaking chlorine mingled with water of the river could form corrosive acids and a toxic gas could escape, of the kind that caused thousands of casualties on the battlefields of World War I. Experts of the U. S. Army Chemical Center estimated that release of the sunken cargo could result in 40,000 to 50,000 casualties within a 30 mile radius, with 10,000 to 25,000 fatalities. Thus a "time bomb" was present in the Mississippi River threatening some 80,000 persons within the danger zone surrounding it.

The WYCHEM 112, a steel barge, 195 feet long, 35 feet wide and 11 feet deep, had four tanks - each more than 75 feet long and over 11 feet in diameter - with 2,200,000 pounds of liquid chlorine contained under 85 pounds of pressure. The tanks were made of steel, 1 3/8 inches thick. The barge was enroute from the Wyandotte Chemical Plant, Geismar, Louisiana, to the Union Carbide Corporation Plant at South Charleston, West Virginia, some 1900 river-miles upstream.

At the time of the sinking of the WYCHEM 112, the Mississippi River was high and its currents ran swiftly. River depths in the area of the sinking were from 80 to 90 feet. The Wyandotte Transportation Company made many attempts to locate the barge but due to the seasonally high water they were unsuccessful.

It would seem that finding an object as big as the WYCHEM 112 would be a simple matter - even on the bottom of the Mississippi River - but just the reverse was true. Sand and silt in the swiftly moving river currents quickly bury sunken objects, and vessels even bigger than the WYCHEM 112 have been swallowed up without a trace.

During July and August 1962, representatives of various Government agencies and the Chlorine Institute met in Washington to discuss further the problem of the sunken chlorine barge. Although the barge could conceivably remain under water for many years without mishap and could not become a danger to navigation, all concerned thought it best to remove the potential hazard as promptly as possible to avert any possibility of endangering public health in the future.

Early in September 1962, the President of the United States assigned to the Office of Emergency Planning the responsibility of overall direction and coordination, including relationships with State political authorities and Congressional representatives, in removing the hazard and directed the Office of Emergency Planning to take all necessary precautions to protect the public. The Director of the Office of Emergency Planning was authorized to use the resources of any Federal Agency and appropriate organizations necessary to safely accomplish this mission.

On September 6, 1962 (confirmed by written document dated 9/10/62), the Office of Emergency Planning delegated to the Public Health Service, through the Department of Health, Education, and Welfare, the primary responsibility for maintaining public health and disseminating public information during the operation. This amounted to responsibility for all operational aspects other than the actual removal of the four chlorine tanks. (See Delegations - Appendix I). The Surgeon General of the Public Health Service designated the Chief, Division of Health Mobilization, Office of the Surgeon General, as the responsible officer in Washington.

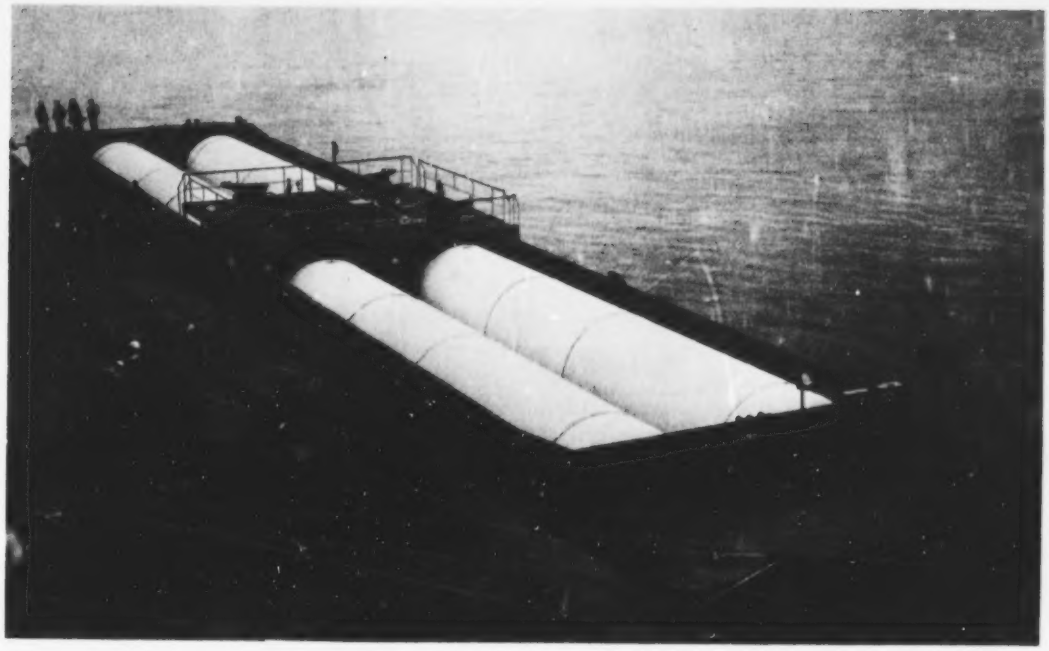


Figure 1. Sister barge to the sunken WY CHEM 112

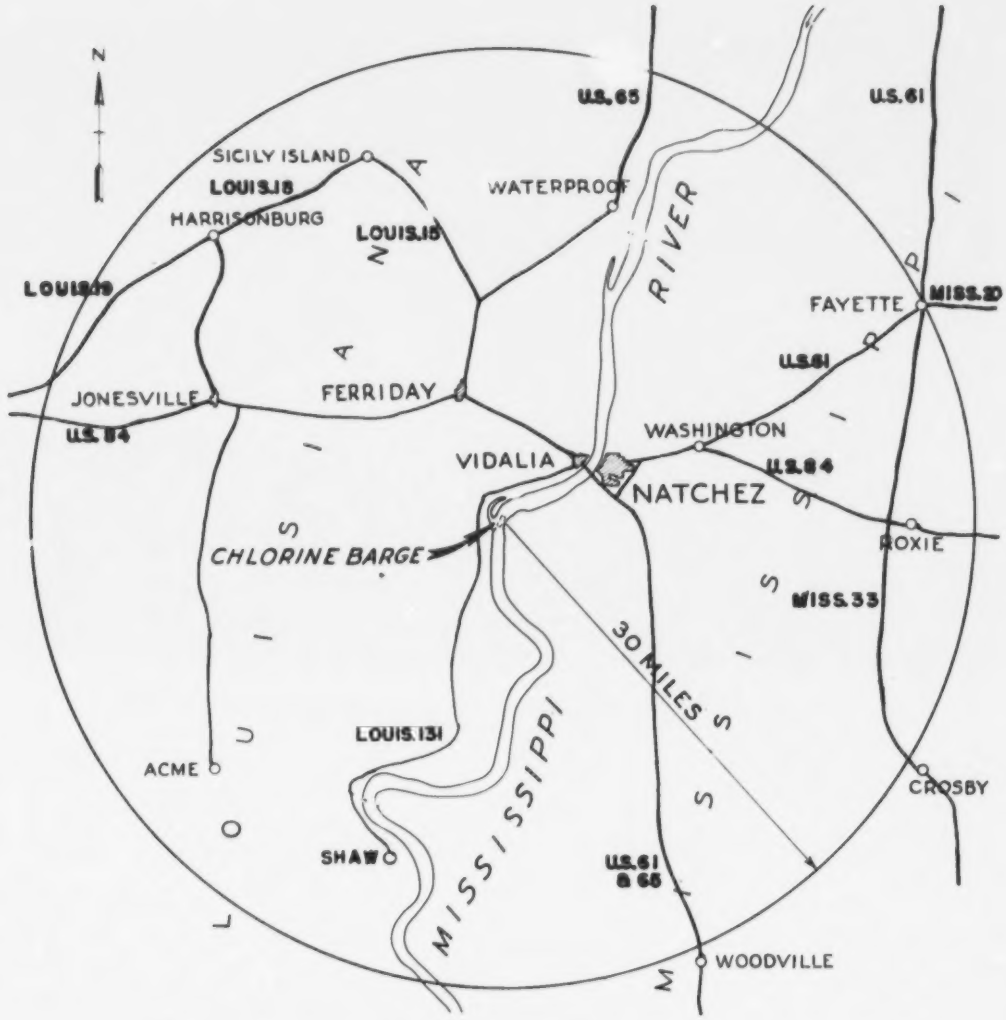


Figure 2. Map of the potential danger zone if there had been an accidential release of chlorine.

The Regional Health Director, Department of Health, Education, and Welfare, Region IV Atlanta, Georgia, was designated to coordinate all field activities of the Public Health Service.

On September 7,1962, the Office of Emergency Planning delegated to the Chief of Engineers, U.S. Army Corps of Engineers, the primary responsibility for removal of the barge and its contents. (See Delegations - Appendix I). The mission of the Engineers was to locate the barge and remove its dangerous cargo as quickly as possible. The engineering aspects of the salvage operation were not only formidable but also carried the prospects of accidental puncture causing leakage or rupture of valves. The plan for removal, therefore, had to afford the maximum possible protection to the public during the salvage operation. The Vicksburg district engineer was assigned field responsibility for this operation.

The President on October 10, 1962 declared, ". . . a potential hazard to health and safety in those areas of the State of Mississippi in the vicinity of the liquid chlorine on a sunken barge, threatens to be of sufficient severity and magnitude to warrant disaster assistance by the Federal Government to supplement state and local efforts." Subsequently upon formal request, similar assistance was made available to Louisiana. Thus a concerted effort by cooperating Federal, State and local authorities was set in motion to relieve the area of a potential public health hazard.

CHARACTERISTICS OF CHLORINE GAS

Chlorine under normal atmospheric pressure is a highly lethal, greenish-yellow gas; it is 2½ times heavier than air and has a sharp, penetrating odor. It is primarily a respiratory irritant causing lung congestion, coughing and laborod breathing. However, it can also cause irritation of the eyes and skin. If the duration of exposure or the concentration of chlorine is excessive, it will result in general excitement of the person affected and will be accompanied by restlessness, sneezing, copious salivation and vomiting. In extreme cases, the difficulty of breathing may increase to the point where death can occur from suffocation.

Chlorine reacts with water to form hydrochloric acid and hypochlorous acid. Although chlorine is a gas at normal atmospheric pressure, for shipment in tanks it is compressed into liquid. Should the tanks rupture, the chemical would pass immediately into a gaseous form. A tiny hole in a chlorine tank submerged in water would soon become a major rupture as a result of the chemical action of the hydrochloric acid on the steel. Should a rupture occur under water a small amount of the liquid would go into solution harmlessly but much would rise to the surface and escape into the air as chlorine gas.

Chlorine is used in the treatment of water and sewage. It is both a germicide and insecticide. Chlorine is used commercially in the manufacture of many products, such as glass, paper, explosives, dyes, and textiles.

PREVIOUS EXPERIENCE

As a result of a 17 car derailment, an accidental exposure to chlorine gas occurred at 8:15 A.M., January 31, 1961, near New Roads, Louisiana, a small rural town, north of Baton Rouge. In the center of the pile-up was a tank car, containing liquid chlorine. This car received a puncture approximately four square feet in area in the lower portion of one end, allowing 30 tons of chlorine to escape. In its path, which covered an area 3½ by 6½ miles, humans sickened and vegetation and animals were destroyed.

The physicians identified the chlorine by its odor on the victims' clothing. Seventy-five persons were treated at the local hospital and one of them, a child, died. The 500 animals which perished were chiefly those which were penned up.

The most commonly reported symptoms among persons exposed to the chlorine gas were a sensation of choking and difficulty in breathing. This was usually accompanied by a very dry feeling in the mouth and throat, which persisted long after the exposure. Many of the patients suffered coughing spasms. Victims reported nausea, headache, and burning and stinging of the eyes. Some of the more seriously affected patients suffered from pulmonary edema, and rescuers reported many were "frothing at the mouth" at the time that they were removed from the exposure area. Many victims reported headaches lasting until the following day. Coughs and "tickling irritations" of the bronchial tract were reported by many victims as long as a week after the exposure.

One physician reported several congestive heart failures among elderly victims. All responded well to treatment. This experience was described by doctors as a "severe traumatic shock" for many of the victims, especially those who displayed a slight tendency toward neurosis. An "end of the world" feeling was reported to have been fairly common.

Chlorine gas disappeared at the scene of the accident within approximately 2 hours but was still present 2 hours later in other affected areas. By the afternoon of the same day the gaseous chlorine had all dispersed. Most of the evacuees were able to return to their homes by the next morning. However, the odor of the gas in homes and personal effects was uncomfortably strong for up to a week.

CHARACTERISTICS OF THE AREA INVOLVED

An area within a radius of 30 miles from the sunken chlorine barge could possibly be endangered by an accidental release of chlorine. This area of 28,000 square miles is located in southwest Mississippi and northeast Louisiana (Figure 2: Map of Potential Danger Area). The area is dominated by one fairly large city - Natchez. Natchez, Mississippi has a population of approximately 25,000. The remaining population of 55,000 is scattered among small towns, villages and rural communities in both Louisiana and Mississippi. Some of the area is sparsely populated, thus presenting a communications problem. About half the population is on the Mississippi side and the other half on the Louisiana side.

The general characteristic of this area is the Mississippi Delta which is very low, densely forested swamp land. An exception to this is the area occupied by Natchez and its suburbs which is situated on high bluffs above the Mississippi River. This elevation, however, was not sufficient to assure protection from a large chlorine gas cloud. This rough terrain is also traversed by creeks and ravines. Due to the concentration of population in Natchez, as compared with the remainder of the danger zone, plans for evacuation were complicated.

Prevailing winds in this area are generally from the south, but during the recovery operation they were variable and predominantly from a northerly direction. The average velocity is less than 8 miles per hour during the Fall of the year.

The three Mississippi counties affected were Adams, Wilkinson, and Jefferson. The three parishes in Louisiana were Concordia, Catahoula and Tensas.

Within a radius of 65 to 100 miles of the sunken barge site and well outside the potential danger zone were located the following cities with populations in excess of 10,000: Brookhaven, McComb, Vicksburg, Jackson, Monroe, Alexandria, and Baton Rouge. These cities and many other smaller communities were involved in the development of evacuation and reception area plans.

ARMY CORPS OF ENGINEERS ACTIVITIES

The Corps of Engineers' search for the barge began on Thursday, September 13, 1962, with the assistance of a U. S. Navy plane having submarine detection equipment. The first search pattern flown by the U. S. Navy aircraft received three definite responses in the area previously investigated by the Wyandotte Company. A magnetic anomaly detector commonly referred to as "MAD" was towed over the search areas and confirmed the existence of iron masses. The "MAD" recorded the highest readings over the up-stream object and the decision was made that the exploration should begin at this site.

A barge mounted with equipment was brought up and anchored over the site. A hydraulic jet was lowered to the bottom of the river and, after penetrating the sand about 3 feet, came to rest on a solid object. Successive jet probes and exploration by a diver confirmed that a large metal object had been located.

The diver searched the area around the jet probe by forcing away the sand with a jetting hose and reported that the area was characteristic of the mid-ship working platform of the lost barge. With a wrench he removed two valve handles and a pressure gauge from the piping equipment that was known to be disconnected from the tanks and brought them to the surface. A representative of the Wyandotte Chemical Company positively identified these parts as belonging to the WYCHEM 112. (The diver formerly supervised a team of divers who trained with the Cape Canaveral Astronauts for underwater recovery of space capsules.)

Jetting, probing and diving continued with each major point of the barge carefully fixed and plotted on survey control drawings until the exact outline and position of the barge, both horizontally and vertically, was established. The barge, at its lowest point, was in 65 feet of water and buried under 14 feet of river-bottom sand and silt at the deepest point of the barge deck (a depth of 25 feet of sand and silt over the barge hull bottom).

Originally the Corps of Engineers had devised four proposed recovery methods for removal of the menace: (1) Lift the whole barge and its cargo - this proposal was eliminated when the barge was found to be broken amidship; (2) Drain the chlorine through hose connections to above water tanks - this procedure was considered to be too dangerous; (3) Bleed off the chlorine into the water - this was considered even more hazardous since there was little assurance that the degree of leakage could be controlled and studies indicated that only a relatively small part of the chlorine would be absorbed in the water and that most of it would pass out into the atmosphere; (4) Lift the chlorine tanks one by one - this was decided to be the safest method of removing the chlorine hazard.

With the known data and the plans and specifications from which the WYCHEM 112 was built, the Corps of Engineers invited all salvage companies who had indicated an interest to submit proposals for removing the four chemical tanks from beneath the sand in the bottom of the Mississippi River. In a joint venture contract arrangement, Brown and Root Marine Operators of Houston, Texas and Triple "C" Boats, Inc., of Morgan City, Louisiana, were selected to do the job of salvaging the chlorine tanks.

The Corps of Engineers Dredge "Nelson" and a pump boat from Jahncke Services of New Orleans removed the bulk sand cover from above and adjacent to the barge. Sand inside the well of the barge and between the tanks was removed by divers using jet hoses and airlifts. A total of 16 divers was involved in the recovery operation.

The working platform over the midship section of the barge was cut away in sections by divers and hoisted to the surface to clear the way for lifting out the tanks one by one.

The contractors constructed a special lifting rig called a "strongback" to fit over the tanks somewhat like an inverted cradle. Six strong steel cable slings were used to secure each tank to the strongback.

Figure 3. Aerial view of dredges and crane equipment at the site of the sunken chlorine barge.

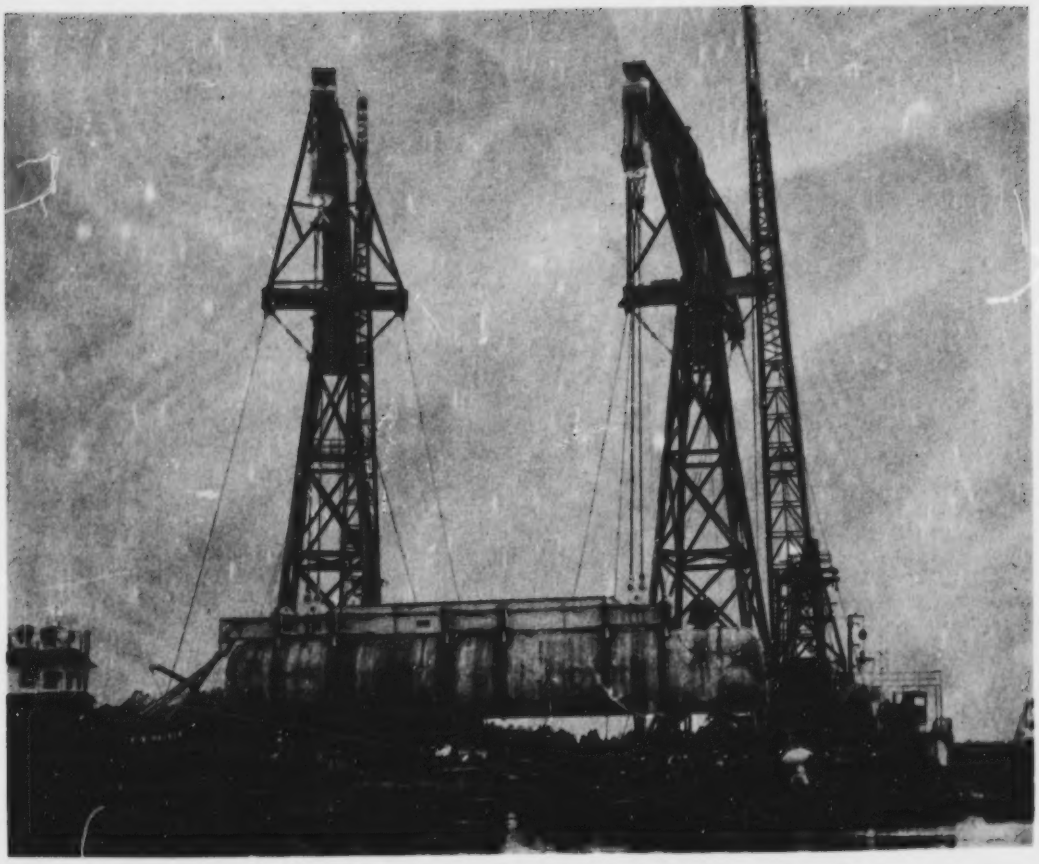


Figure 4. Raised chlorine tank attached to strongback just prior to lowering into cradle barge.

Two hammerhead cranes with a lifting capacity of 350 tons each, working in unison, one fastened to each end of the strongback eased the tanks to the surface; when hoisted clear, a barge with a special receiving cradle was positioned directly below the tank, whereupon it was lowered gently into place. (Figure 3: The equipment involved in the recovery operation. Figure 4: The raising of one of the sunken chlorine tanks.)

Throughout this entire operation every safety precaution possible was exercised. Every step in the salvage operation was checked and rechecked. Twenty-four hour a day surveillance for detection of leakage of chlorine was maintained. Emergency breathing devices were on hand for every workman. Chemical experts were on duty at the scene at all times. In case of a leak developing when the tank was brought up, special capping equipment was on hand and personnel experienced in making repairs were standing by. Large fans were in position to blow gas fumes away and allow workman to make repairs to the tanks if necessary. An elaborate communications system connected all units, including the Public Health Service Emergency Operation Headquarters. In addition, flares, red smoke grenades and a smoke generator were in place ready for use to give visual signals if an emergency arose.

ESTABLISHMENT OF PUBLIC HEALTH SERVICE EMERGENCY OPERATION HEADQUARTERS

The Public Health Service Emergency Operation Headquarters was established in Vidalia, Louisiana on September 17, 1962, at the Corps of Engineers Area Office and was operated until November 8, 1962. Dr. Hugh B. Cottrell, Regional Health Director, DHEW Region IV, Atlanta, Georgia, was designated as Director of the PHS Emergency Headquarters. Dr. G. P. Ferrazzano, Chief, Division of Health Mobilization, Office of the Surgeon General, and Dr. James M. Hundley, Assistant Surgeon General for Plans, provided Headquarters assistance in the development of policy and intergovernmental relationships. Mr. Richard W. Bowman, Executive Officer, Division of Health Mobilization, assisted Dr. Cottrell in administrative and operational details of coordinating the total public safety and public information aspects of the operation. Mr. Walter C. Hughes, Program Director for Health Mobilization, DHEW Region IV, had the responsibility for working with officials in the development of plans and maintenance of emergency readiness in Mississippi. Mr. Dawson Kilcrease, Program Director for Health Mobilization, DHEW Region VII, had the corresponding responsibility for Louisiana. (Figure 5: A planning session at PHS Emergency Operation Headquarters.)

Subsequently, Dr. James McGee, Program Director, Community Health Services, DHEW Region IV, was assigned to the Natchez-Adams County Health Department to assist in carrying out health department responsibilities. Mr. Verne Fisher, Public Health Advisor for Health Mobilization assigned to Louisiana State Board of Health was detailed to the operation to assist in health department activities in Louisiana. Dr. Bobby G. Fulmer was

detailed, from the PHS Outpatient Clinic in Mobile, Alabama, to man the medical aid station at the chlorine tank recovery site. In addition, twelve engineers and sanitarians from DHEW Regions IV and VII spent short periods of time in assisting in the Public Health Service and Weather Bureau activities during Operation Chlorine.

The organizational chart, Figure 6, shows the delegating authority, Office of Emergency Planning, and the two Federal agencies that were primarily responsible for health and safety factors and the salvage operation. The Public Health Service emergency operation is presented in Figure 7. This organizational chart indicates the various organizations that assisted the Public Health Service directly in carrying out its assignment.

Appendix II lists Federal personnel, including Red Cross, assisting or requested by PHS Emergency Operation Headquarters.

THE ROLE OF AGENCIES ASSISTING THE PUBLIC HEALTH SERVICE

American National Red Cross

The American National Red Cross did not receive a Federal delegation but was requested by the Office of Emergency Planning to assume major responsibility for sheltering, reception and care of evacuees outside the potential disaster area. The Director of Disaster Services, Southeast Area Office, Atlanta, was placed in charge of Red Cross disaster activities at the site of operations. (Figure 8: The Red Cross office at PHS Emergency Operation Headquarters.) Locally, the Red Cross signed a memorandum of agreement with the State Civil Defense Agency and Welfare Department of Mississippi whereby the Red Cross was given the responsibility of reception and care of evacuees. A similar mission was assigned by the Louisiana Department of Public Safety. 22,477 cots and 44,440 blankets were supplied to Red Cross from the Civil Defense Medical Stockpile Depots managed by the U. S. Public Health Service. Eight field canteens were set up in strategic locations. The Red Cross was complimented by officials for the speed with which shelters were stocked in Mississippi (87) and Louisiana (45). The Red Cross assumed financial responsibility for providing hospital and nursing home care for 30 chronically ill patients who, for various reasons, were not to be transported to relocation hospitals.

Throughout the entire operation the Red Cross worked in close cooperation with the Public Health Service.

Figure 5. Planning session in Public Health Service Emergency Operation Headquarters.

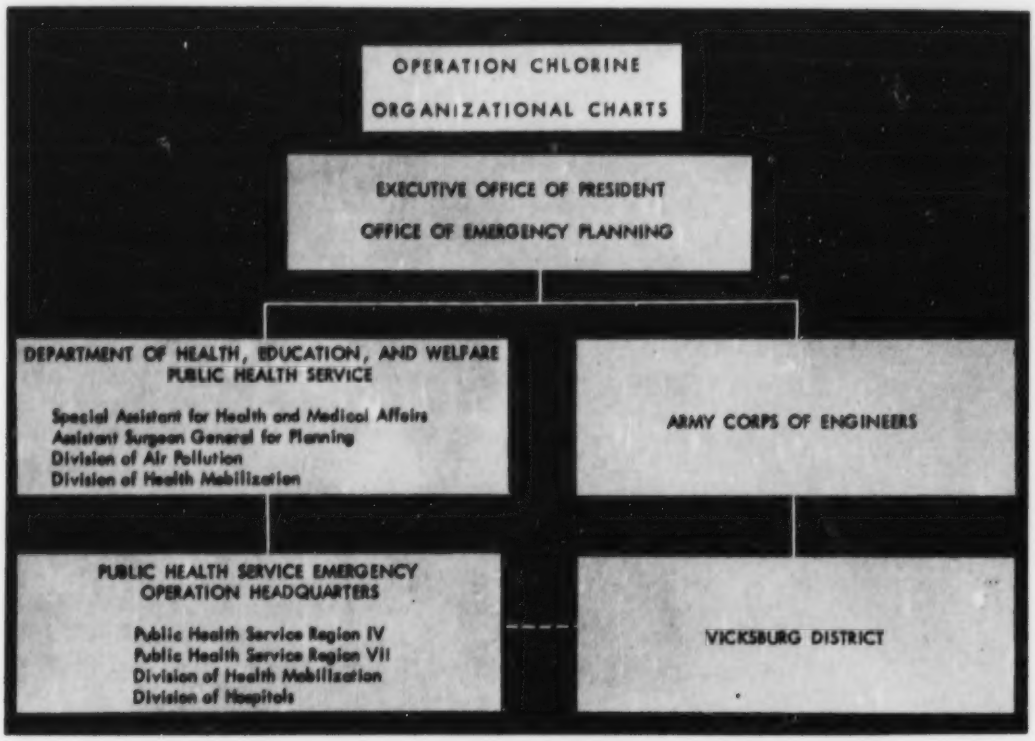


Figure 6. Organizational Chart of Federal agencies delegated responsibilities for Operation Chlorine.

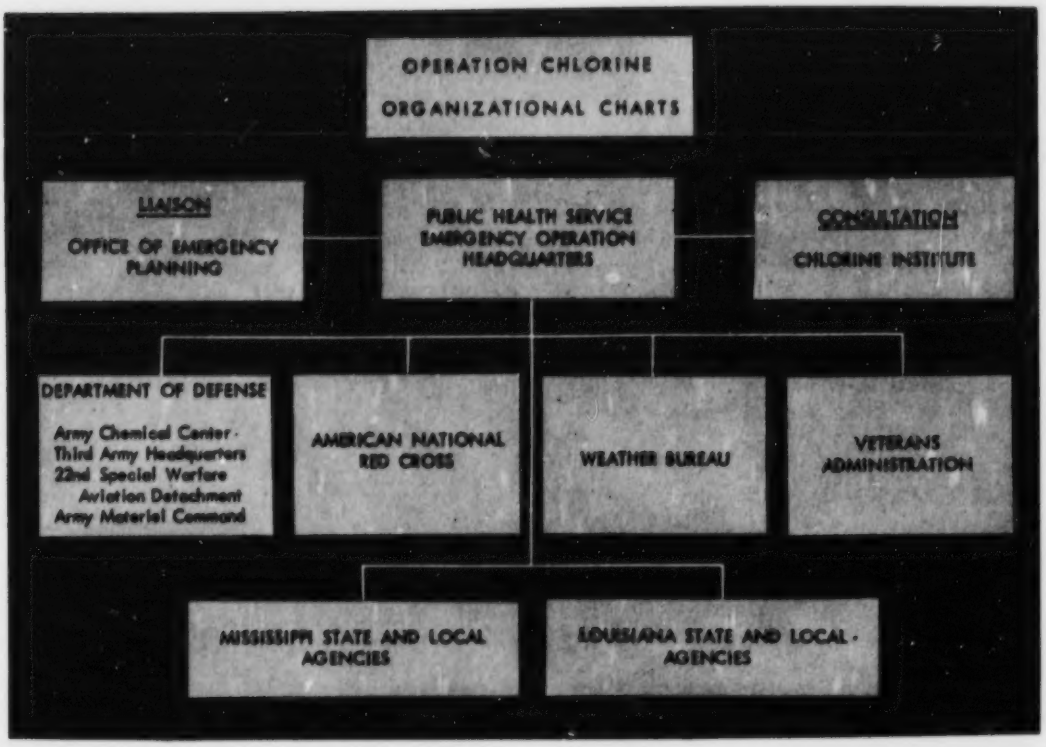


Figure 7. Organization Chart of PHS Emergency Operation Headquarters.

Figure 8. Red Cross office at PHS Emergency Operation Headquarters.

Veterans Administration

The Veterans Administration responded speedily and ably to a request to make 225 hospital beds available. The Atlanta and St. Louis Area Medical Directors assigned representatives to the Public Health Service Emergency Operation Headquarters to assist in the processing of patients for transfer from the danger zone to the Veterans Administration Hospitals. The four Veterans Administration Hospitals receiving patients were Alexandria and Shreveport, Louisiana, and Biloxi and Jackson, Mississippi.

Weather Bureau

Since meteorological conditions could play an important role in determining the dispersal of the chlorine cloud in case of an accidental release, the Public Health Service requested the Weather Bureau to assist in carrying out its delegation. The Weather Bureau was responsible for maintaining current weather condition advisories. Several kinds of services were provided: special forecasting; forecasting of wind direction and velocity and other meteorological phenomena on a local basis. The Weather Bureau provided equipment for establishing six local weather stations which supplied valuable information on a current basis, and added greatly to the success of Operation Chlorine. (Figure 9: The Weather Bureau control center at PHS Emergency Operation Headquarters.)

Department of Defense

The unique situation of providing health protection for thousands of persons required considerable government support in materiel and manpower. Various units of the Department of Defense were called upon for assistance. They included: the Army Chemical Center, the Third Army Headquarters, the Air Force, the 22nd Special Warfare Aviation Detachment, and the 19th Psychological Warfare Company. The Third Army assigned a liaison officer to PHS Emergency Operation Headquarters. This liaison function was vital in expediting the procurement of essential supplies and equipment.

Chlorine Institute

Upon request, the Chlorine Institute made available through the Wyandotte Chemical Company its medical consultant, Dr. Joseph T. Noe. He assisted in giving instructions to health and medical personnel on the latest methods of treatment for chlorine poisoning. The Chlorine Institute also provided other valuable consultant services and scientific materials.

THE ROLE OF STATE AGENCIES

Appropriate State agencies, by proclamation, directive or request, rendered services and provided materiel which were coordinated to implement all plans necessary for the protection of the public during Operation Chlorine. The broad responsibilities of the various operational agencies are presented here; details of their contribution are described elsewhere in this report.

LOUISIANA

Department of Public Safety

At the request of the Adjutant General, the Department of Public Safety accepted the overall responsibility of formulating emergency plans and preparing for the safety of the population in that area of Louisiana which might be affected by an escape of chlorine gas during the recovery operation.

State Police

As a component part of the Department of Public Safety, the State Police had the following responsibilities: establishing an area-wide warning system; arranging methods of communication; organizing a program for prompt, effective traffic control; maintaining sufficient means of transportation for all evacuees; providing assistance to local officials, and to the State Board of Health, during evacuation of chronically ill and handicapped patients; adopting security measures for the safety of the population and for the protection of all property; maintaining public information services; obtaining Federal and State assistance in the acquisition of necessary supplies and equipment. (Figure 10: The Louisiana State Police Emergency Operation Headquarters and both the State Police and U. S. Coast Guard Communication Centers.)

State Department of Wildlife and Fisheries

At the request of the State Police, the Department of Wildlife and Fisheries agreed to assist in establishing a warning system by furnishing mobile radio units and assuming responsibility for warning the population of a given sector of the danger zone.

State Board of Health

The State Board of Health was responsible for: assisting local authorities in providing for the care of the sick and injured, and for sanitation and health problems of evacuees; conducting a survey of the danger zone to determine the total number of chronically ill and handicapped patients; determining how many of these patients would need assistance in being evacuated from the danger area;

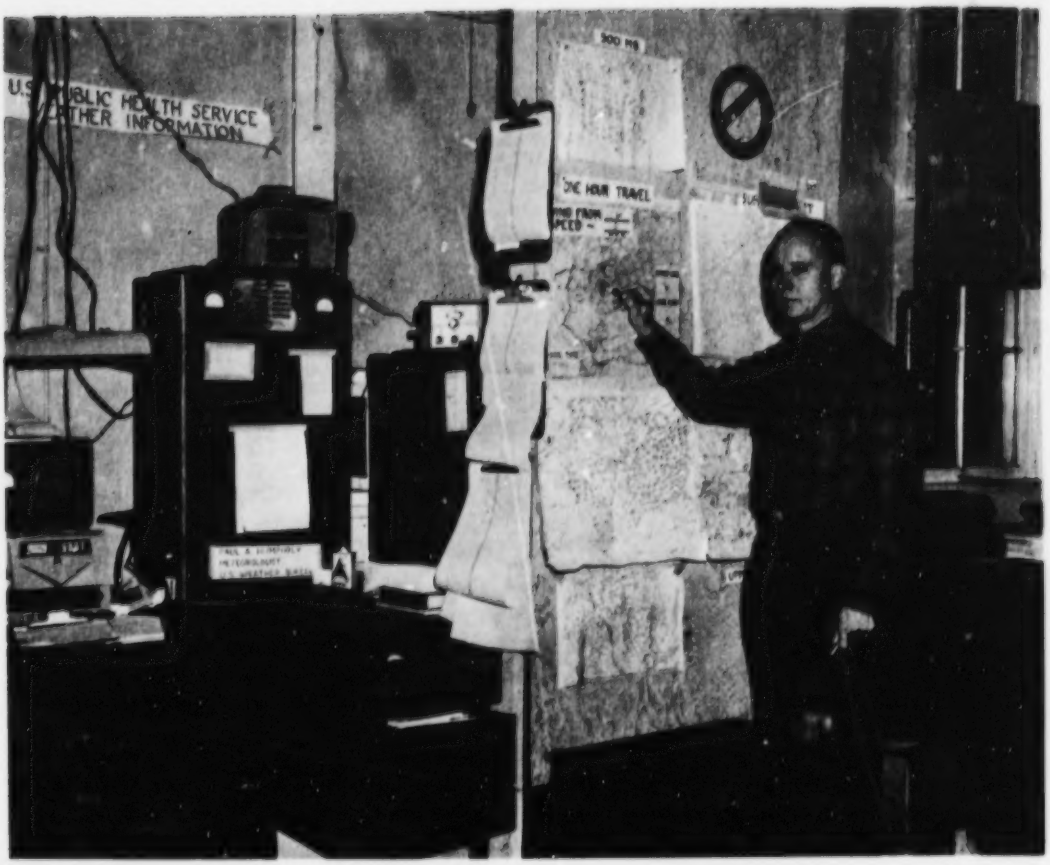


Figure 9. Weather Bureau Control Center at PHS Emergency Operation Headquarters.

Figure 10. Louisiana State Police Emergency Operation Headquarters and Louisiana State Police and U. S. Coast Guard Communication Centers.

obtaining permission and medical records from physicians of patients to be evacuated; arranging transportation for patients to be evacuated prior to lifting of tanks, and for their return after completion of operations; providing monitoring teams to monitor the danger area if a disaster occurred.

State Department of Public Welfare

The State Department of Public Welfare assisted the State Board of Health in conducting a survey to determine the total number of chronically ill and handicapped patients in the danger zone. The Department of Welfare also provided special services for beneficiaries who required assistance, and welfare staff cooperated with the American National Red Cross in the program for the care of evacuees.

State Civil Defense Office

The State Civil Defense Office provided assistance to the State Police in the development of the emergency plans for Operation Chlorine. A liaison officer was assigned from this office to the Louisiana State Police.

State Adjutant General's Office

The Adjutant General was on stand-by to assist in the operation if necessary.

MISSISSIPPI

State Adjutant General's Office

On the same date that the President determined that the disaster threat in the area surrounding the sunken barge warranted assistance by the Federal Government under Public Law 875, the Governor of Mississippi ordered the State National Guard into service. Under the Governor's proclamation, the Adjutant General was assigned the responsibility of overall control and coordination of authority for State agencies assisting local authorities in warning and evacuation procedures. He was also responsible for preserving law and order. The National Guard provided personnel and transportation equipment to assist the State Board of Health in the evacuation of the chronically ill and handicapped from the danger area. Liaison personnel were assigned and located at PHS Emergency Operation Headquarters. (Figure 11: An aerial view of National Guard encampment at the Natchez Armory.)

State Civil Defense Council

The Civil Defense agency was charged with the responsibility of providing necessary liaison and emergency planning for the various State agencies involved in Operation Chlorine. A public information officer was detailed to PHS Emergency Operation Headquarters.

State Board of Health

The State Board of Health had the following responsibilities: providing for the care of the sick and injured; managing sanitation and health problems of evacuees; making a complete survey of the danger zone to determine the total number of chronically ill and handicapped patients; determining how many of these people would need assistance in evacuation of the area; obtaining the necessary medical records and authorization from physicians and families of patients to be evacuated; arranging transportation for patients out of the area prior to the raising of the tanks and for the return of evacuees after termination of the emergency; providing staff for monitoring the danger zone in the event of disaster; instructing area physicians and hospital personnel on medical aspects of chlorine gas. The supervisor of Health and Medical Defense was assigned to PHS Emergency Operation Headquarters.

State Department of Welfare

The Department of Welfare had the responsibility of emergency planning for reception and care of evacuees, including housing, feeding, clothing and registration. The Department of Welfare signed a memorandum of understanding, with the American National Red Cross, whereby the Red Cross carried the major responsibility for the reception and care of evacuees in shelters.

State Highway Department

The Highway Department was responsible for arranging and coordinating transportation from the evacuation area and establishing effective traffic controls to and from the reception centers.

State Public Safety Commission

The Highway Patrol was responsible for assisting with communications and traffic control.

FEDERAL MATERIEL ASSISTANCE AND USE

Collective Protectors M-6	32
Positive Pressure Inhalators	25
Helicopters, Model OH-13G	3
Sound Equipment	5
Cots	22,477
Blankets	44,440
Military Airplanes:	
C119	32
C124	8
Gas Masks M9-A1	42,587
Canisters M-11	500

M-15 Breathing Apparatus Masks	80	
Smoke flares and grenades	4	cartons
Smoke generator	1	
U. S. Coast Guard 40' Boats:		
CQ40461	1	
CQ40418	1	
U.S. Coast Guard Communications Truck (T13448)	1	
Oxygen tanks	2	
Drugs and Medical Supplies:		
Isuprel	50	cc
Alevaire	1	pint
Tyzine Nasal Solution	50	cc
Isuprel Mistometer	12	
Phenobarbital 2-grain ampules	12	
Disposable Syringes, 2 cc	36	
Disposable Syringes, 10 cc	12	
Alcohol sponges	100	
Saline Sterile Eye Wash, Squeeze Bottles	2	
Aminophylline Ampules, 7.5 grains	12	
Benzocaine Throat Lozenges	50	
Neo Decadron Eye Solution, 10 cc bottles	2	
Benadryl Expectorant Cough Syrup	1	pint
Mississippi National Guard Requisitions:		
Sleeping bags	2,500	
General purpose tents	50	
Tent stoves	350	
Stove pipe shields	230	
Air-conditioning elbows	100	
"C" rations	10,000	
H-34 Helicopters equipped for medical evacuation	2	

The 32 collective protectors were used at the following locations:

Location	Number Used
Recovery Site	4
City Hall, Natchez, Mississippi	1
Police Station, Natchez, Mississippi	1
Sheriff's Office, Natchez, Mississippi	1
National Guard Armory, Natchez, Mississippi	1
Medical Aid Station, Morville Landing	2
Natchez General Hospital, Natchez, Mississippi	3
Jefferson Davis Hospital, Natchez, Mississippi	5
Charity Hospital, Natchez, Mississippi	2
Washington Clinic, Natchez, Mississippi	1
City Garage, Natchez, Mississippi	1
Telephone Company, Natchez, Mississippi	1
Immanuel Baptist Church, Natchez, Mississippi	6
Grace Methodist Church, Natchez, Mississippi	1
International Paper Company, Natchez, Mississippi	1
Armstrong Tire Company, Natchez, Mississippi	1

Positive pressure inhalators were located at the following places for the use of anyone who might be exposed to the chlorine gas:

Location	Number Used
Public Health Service Medical Aid Station	2
Whitaker Clinic, Newellton, Louisiana	1
Herman Gibson, M. D., Ferriday, Louisiana	1
Guy Campbell, M. D., Jena, Louisiana	1
Jefferson Davis Hospital, Natchez, Mississippi	7
Charity Hospital, Natchez, Mississippi	5
General Hospital, Natchez, Mississippi	3
Immanuel Baptist Church, Natchez, Mississippi	2
Centerville Hospital, Centerville, Mississippi	1
Port Gibson Hospital, Port Gibson, Mississippi	1
Meadville Hospital, Meadville, Mississippi	1

Three Army helicopters, model OH-13G, equipped with loud-speaker units and air evacuation stretchers were assigned to the Louisiana State Police for use in the warning plan as well as for use in evacuating injured persons from the Medical Aid Station.

In reception centers, 22,477 cots and 44,440 blankets were used to augment the approximately 1,000 owned by Red Cross.

Thirty-two C119 and eight C124 Army cargo aircraft as well as commercial vehicles were used to transport the cots and blankets from the civil defense medical stockpiles located at Bastrop, Texas, and Prairie, Mississippi.

Gas masks, totaling 42,587, were delivered to the disaster area and 34,583 gas masks were issued. About 2,500 were issued in Louisiana, 31,500 in Mississippi and 500 were issued to the Coast Guard for use by river traffic personnel. Eight thousand unissued masks were returned at the request of the Army during the Cuban crisis.

The U. S. Coast Guard furnished one communications truck and two 40 foot boats (CG40461 and CG40418). The communications truck was used for communications between the barge operation and the two boats. The boats had the responsibility of keeping all river traffic in the area informed of the progress of the operation and of issuing gas masks to river traffic that had to enter the danger area.

Red smoke flares, grenades, and a smoke generator were obtained from the Military for use at the barge site. Had the chlorine escaped, colored smoke would have served as one of the signals of escaping chlorine gas.

Eighty M-15 Breathing Apparatus Masks were on hand at the barge recovery site for use by the recovery task force should an accident occur.

Drugs were obtained and placed at the PHS Medical Aid Station. Two tanks of oxygen were also prepositioned at this site.

PUBLIC INFORMATION

While the chance of accidental release of chlorine prior to actual recovery operations was slight, still people in the area had to be alerted and prepared to meet the possibility of chlorine gas escaping at some time during dredging or lifting operations.

Simultaneously with the establishment of the Public Health Service Emergency Operation Headquarters, a press conference was held in Natchez to which representatives from all the newspapers, radio and television stations in the area were invited. The distribution of background data and brief presentations by the Public Health Service and Army Corps of Engineers were followed by a question and answer period lasting for about a half hour. Many business and civic leaders of the community also were present during the meeting.

Very soon after the establishment of the PHS Emergency Operation Headquarters, the Public Health Service and the Corps of Engineers developed a procedure for issuing official government press releases each day. Under this procedure, each agency prepared its statement and after clearance by both, a consolidated release was issued. The Public Health Service gave copies of the releases to the public information officers of Mississippi and Louisiana; the Army District Corps of Engineers Office in Vicksburg subsequently sent the releases on a TWX to the wire services and other news media. The Public Health Service Emergency Operation Headquarters staff participated in numerous television, radio and local group presentations as requested.

Following a national press conference by a Public Health Service official in Washington, D. C. on September 21, an Associated Press article carried in the Jackson Daily News on September 22 was boldly headlined, "CHLORINE GAS SCARE IS ON". The New Orleans States and Item headed an article, "NATCHEZ HAS JITTERS: SEEK TO AVERT PANIC OVER GAS." Almost daily for several weeks newspaper headlines reminded area residents of the grim gas vigil at Natchez. One press article referring to an earlier railroad tank car accident wrote, "Dense, choking clouds of chlorine gas spread over the countryside and in its path vegetation, animals and humans sickened and died."

To further suggest to the public that the situation was indeed of a serious nature, public health workers, engineers and technicians, Louisiana and Mississippi State Police forces, contingents of the

American National Red Cross, chemical experts, Mississippi National Guardsmen, divers and salvage workers with their equipment began to appear in increasing numbers.

To counteract growing tensions, the old adage, "knowledge replaces fear", was followed early in Operation Chlorine. In order to offset numerous rumors and false information, one city official contracted for a daily news column to give factual information. (See Appendix III for a list of the most common rumors.) All available public information media was utilized to explain that, although the possibility of danger was slight, every precaution for the protection of the health and welfare of the population in the danger zone was being taken. It was felt that people who are fully informed concerning a potential danger become a fully prepared people. Certainly this was true of the citizens involved in Operation Chlorine. There was no panic. Men and women went about their daily business as usual. Children were calm and cooperative. All 750 children attending one school, after two weeks drilling, could be in place in emergency evacuation vehicles in less than two minutes from the moment warning was given. A truly remarkable feat!

At numerous meetings the Public Health Service presented facts regarding the medical and physical aspects of chlorine. Some community leaders became alarmed over the situation to a point that they requested mass meetings be held. Such a meeting was held for school officials, teachers, and PTA representatives. It was emphasized that no one could predict when an escape of gas might occur and therefore the evacuation plan must provide for children while in school and out of school. The Corps of Engineers announced that recovery operations would be performed around the clock, 7 days a week, but that the more hazardous phases of the work would be performed only during daylight hours.

The difficult and potentially dangerous work, preliminary to the actual lifting of the four chlorine filled tanks, deserved and received wide news coverage. Preparation for public safety went ahead simultaneously with preparation for the salvage of the chlorine tanks. Everyone was told that precautionary measures were "drum tight".

News media personnel from newspapers, national magazines, radio and television came almost daily to the PHS Emergency Headquarters for personal interviews.

On October 18 the PHS Emergency Operation Headquarters in cooperation with the Army Corps of Engineers began issuing two bulletins daily; one at 9:00 A.M. and one at 3:30 P.M. The demand for news and

photographic coverage had reached its peak. The people listened constantly to their radios and quickly grabbed up available newspapers eager to learn every detail of Operation Chlorine. Medical personnel in the area at this time were receiving the latest information regarding the treatment of chlorine poisoning. A medical official from Wyandotte Chemical Company began instructions at a meeting of medical and allied medical personnel at the Jefferson Davis Memorial Hospital, Natchez; a Public Health Service Officer gave similar instruction at other hospitals in the area. Seven hospitals in Mississippi and three hospitals in Louisiana were designated as chlorine treatment centers. These hospitals were equipped with positive pressure inhalators and with the medications necessary to treat chlorine poisoning.

Seriously ill or handicapped citizens, usually very elderly, presented a unique problem since they could not be easily and safely evacuated with the general population in an emergency. However, to the surprise of everyone, all patients of the four nursing homes in Natchez agreed to be moved from the area at an early date by airplane. Many had never flown before and welcomed this opportunity. Wide news coverage was given to the evacuation of the sick and injured. One of the television stations in Jackson, Mississippi carried a thirty minute documentary on Operation Chlorine, which included the arrival of invalids at the Veterans Administration Hospital in Jackson via Mississippi National Air Guard Constellation.

Newsmen had a ringside seat when each tank was lifted from the Mississippi. Certain newsmen had mobile transmitter sets on board the Lipscomb, a Corps of Engineers vessel provided especially for newsmen, which they used for direct broadcasts each time a tank was raised. The Mayor of Vidalia, Louisiana remarked after the last tank was raised, "This is the one I wanted to see, now we can all get back to normal living around here."

DEVELOPMENT OF EMERGENCY PREPAREDNESS PLANS

The planners of this operation knew that no killers can compare with apathy and confusion when determination and order are necessary for survival. Thus, preparing the over-all operational plans for the health safety factors of the people in the potential danger area became a primary concern of the responsible leaders. The maximum benefit of all resources, manpower and materiel, had to be realized.

With this mission in mind, leaders concerned with the preparation of the emergency operational plans began to organize resources to meet their responsibilities. These resources came from a great many Federal, State and local organizations.

The leaders in preparing emergency plans had to consider the dissemination of information; training of the public in health and safety measures; assessment of available personnel and materials; establishment of methods for their assignment and utilization; provision of guidance and control; and coordination of all plans with all agencies concerned.

The Public Health Service Emergency Operation Headquarters realized that should the potential hazard become a disaster the best way of reducing the tremendous disparity between the availability of, and the need for, medical assistance would be to reduce the number of casualties by sound, concrete planning. Any person, who has heard of plans and preparations for lifesaving action, will very likely recall methods to be employed in time of need. A person, generally, will be able to contribute to survival only to the extent he has knowledge of the situation. Thus, PHS Emergency Operation Headquarters staff spent a great deal of time assisting local government officials in the preparation of emergency plans; this included briefing groups such as civic organizations, school officials, and Parent Teacher Associations on the implementation of these plans.

The plan for this particular operation consisted of five parts: (1) Warning, (2) Evacuation, (3) Relocation and Reception Centers, (4) Medical Preparedness, and (5) Security and Post-Evacuation Activities.

Warning

The Public Health Service established a communication center in its Headquarters Office in Vidalia, Louisiana. Two separate short-wave radio systems, supported by separate power supplies, were established by the Army Corps of Engineers to transmit warning from the recovery site to the Public Health Service. In addition, the Army Corps of Engineers had flares and red smoke grenades at the salvage site to use as a visual warning signal.

Emergency Operation Headquarters maintained a constant 24-hour alert until the chlorine hazard was eliminated. Current information on area wind speed and wind direction was constantly monitored and reported by meteorologists. This information was vitally needed in order to place priorities on which sections of the disaster area had the greatest imminent danger and would need attention immediately should the chlorine escape.

Had the potential disaster become a reality, the PHS Emergency Operation Headquarters would have notified the following stations by various means:

Louisiana State Police Communications Center
Mississippi National Guard Headquarters
Natchez, Mississippi, Police Department
U. S. Coast Guard Communications Center

A. Louisiana

The Louisiana State Police Disaster Emergency Operational Headquarters was located adjacent to the building occupied by the PHS Emergency Operation Headquarters. Positive communications were established between these two points by:

1. A direct telephone wire (blue phone)
2. Personal contact

From the State Police Communications Center the warning would be disseminated to the following by radio frequency 39.5: (Figure 12: Louisiana State Police Communications Center.)

1. Sheriff's Office, Concordia Parish
2. Sheriff's Office, Catahoula Parish
3. Sheriff's Office, Tensas Parish
4. Sheriff's Office, Avoyelles Parish
5. All Mobile Communications (such as Wild Life and Game Commission)
6. Louisiana State Police Check Points (1-4, 7-9)
7. Red Cross Communications Car No. 1
8. City Police Department, Vidalia, Louisiana
9. City Police Department, Ferriday, Louisiana
10. Sheriff's Office Radio Station, Shaw, Louisiana
11. Louisiana State Police Substation, Sicily Island, Louisiana

The warning would be disseminated to all Louisiana State Police District Headquarters by radio frequency 44.7. By TWX the warning would be disseminated to the following:

1. Louisiana State Police Headquarters, Baton Rouge, Louisiana
2. Troop E, Alexandria, Louisiana
3. Troop F, Monroe, Louisiana

By telephone:

1. Shamrock Motel--Residence of Operation Personnel
2. Fire Department, Vidalia, Louisiana
3. Civil Defense Director, Ferriday, Louisiana

By personal contact:

Three Army Helicopters, Model OH-13G with Loudspeaker Equipment

Once the warning reached the various local areas within the danger zone, the residents would be further warned by sirens (police, fire and civil defense). The three helicopters would fly predetermined routes giving the warning by loudspeakers. In addition to the speakers, a red flag was attached to each helicopter and the residents were notified that the red flag would be the warning signal in the event that the loudspeakers were inoperable.

All radio stations in the area would remain operable on a 24 hour basis, even though not broadcasting, so the residents could leave their radios on when retiring for the night. If the warning came during the night, the radio stations would immediately begin to broadcast the warning, thereby awakening the residents for evacuation of the danger zone.

B. Mississippi

The Headquarters Warning Station was established at the Mississippi National Guard Command Post located at the National Guard Armory, Natchez, Mississippi. Positive communications were established between National Guard Headquarters and the Natchez Police Department and the Public Health Service Emergency Operation Headquarters by:

1. A direct telephone wire (pink phone)
2. A Natchez area direct dial telephone, 445-8031

Upon receipt of the authenticated order to evacuate, the warning station planned to activate the following:

1. The National Guard warning station would maintain a 24-hour access to a direct telephone line connecting radio and television stations in Natchez, Centerville, McComb, Brookhaven, Hazlehurst, and Jackson. Between the hours 2300 and 0600, when radio and television stations normally are not operating, it would be necessary for the stations to remain operative or be able to become operative on a moment's notice in order to maintain complete warning capability.

2. The warning station would be supported by six L-19 aircraft and four H-23 helicopters equipped with loudspeakers.

3. One helicopter would be available at the barge site in case of an escape of chlorine in order that the chlorine cloud could be followed and the information given to the warning station.

4. The Mississippi State Police had a communications center located at the Natchez Auditorium and was in constant touch with the Natchez City Police. The State Police, upon receiving the warning, would disseminate the information to all State and local police mobile units operating in the disaster area.

5. Block wardens (National Guard personnel) were designated where necessary.

6. An AM communication radio network for warning was set up and operated in conjunction with Headquarters Warning Station.

7. Once the warning reached the local areas within the danger zone, the residents would be further warned by sirens (police, fire and civil defense).

C. The U. S. Coast Guard

The Coast Guard had radio communications with all Mississippi River traffic having radio equipment and was responsible for warning them of the hazard or the occurrence of accidental release of chlorine gas. Also included in the warning system was the traffic on the Quachita, Black and Red waterways between mile 14 Red River and mile 83 Quachita River.

The Coast Guard would receive the warning by two means:

1. Direct radio communications between the U. S. Army Corps of Engineers ship, "Hood", and the Coast Guard communications bus.

2. Telephone from the PHS Emergency Operation Headquarters.

Check points were manned at (a.) Red River Landing and (b.) Goldman Landing by Coast Guard boats equipped with radio and at (c.) Lock and Dam #2 by a mobile Coast Guard Communications unit. The purpose of the check points was to give the warning to all river traffic approaching and within the danger area. They also issued and collected gas masks for all river traffic passing through the danger zone.

All river traffic was instructed to monitor channel "Four", 2,738 kc's throughout passage of the danger zone.

Arrangements were made between the U. S. Coast Guard and the Mississippi Air National Guard for the warning of small craft which might be in the area without radio. One Mississippi Air

National Guard plane, equipped with loud speakers, would fly back and forth over the river giving constant warning to all small boats.

Evacuation

It was an accepted fact, that should a major chlorine escape occur, there would be no substitute for evacuation; plans were developed accordingly.

A. Louisiana

Evacuation from the affected area was to be in accordance with plans prepared by parish and local governments, utilizing transportation means available locally. Parish and community owned buses and local commercial transportation were to be used to supplement privately owned transportation as necessary. The State Highway Department was to furnish trucks to further augment transportation in areas not prepared to meet the requirements.

Primary evacuation movements in the disaster area of Louisiana were possible to the north and west only. Movements from Highway 84 east of Frogmore were restricted to northern movements (via Highways 15 and 65). Movements west of Frogmore were to the west.

Schools were given special attention. Sufficient transportation was on the school grounds at all times during school hours to move all children out of the danger area should that have become necessary. During non-school hours, parents were to assume the responsibility for evacuation of children.

The State Department of Health was given the responsibility of planning and providing for the care of the sick and injured, for sanitation and health problems of evacuees, and for the evacuation of patients from clinics and hospitals in the danger zone.

The American National Red Cross had the responsibility for reception and care of evacuees.

B. Mississippi

The purpose of the Mississippi evacuation plan was to provide command guidance for evacuation of the population living in the danger area. The plan was predicated upon the use of the Mississippi National Guard. The most critical danger area - the city of Natchez - was divided into five sectors. Each sector was assigned an evacuation

Figure 11. Aerial view of National Guard encampments at Natchez Armory.

Figure 12. Louisiana State Police Communications Center.

route and each sector would evacuate to an assigned town or towns. (Figure 13: A map of the Natchez evacuation plan.)

Evacuation routes were north, east and south along Pine Ridge Road North, U.S. Highway 61 North, Liberty Road East, and U. S. Highway 61 South. The sector in which a person was located, when the order to evacuate was given, would determine which evacuation route he would use.

The Mississippi National Guard, Highway Patrol, and local law enforcement officials, set up traffic control points to direct traffic along avenues of evacuation.

The evacuees would use their own transportation if available. The principal mode of transportation, however, would be vehicles belonging to the National Guard. In addition, railroad equipment was placed on a siding in downtown Natchez to assist in the evacuation.

Evacuation of all children during school hours was a priority mission and would be effected by school buses augmented by National Guard transportation, which was kept at the schools on a stand-by basis with drivers on the alert. (Figure 14: A practice exercise of the evacuation of a school.) Each Sector Commander (Mississippi National Guard Officer) was responsible for the evacuation of all schools located in his respective sector. The evacuation of school children during non-school hours would be effected from the block warden areas. Each sector was responsible during non-school hours for the location and availability of school buses and other evacuation transportation necessary to effect evacuation of school children and personnel not having access to family-owned transportation.

The American National Red Cross had the responsibility for reception and care of evacuees.

C. <u>The U. S. Coast Guard</u>

Had the escaping chlorine gas made evacuation necessary, the U. S. Coast Guard Headquarters communication unit was to evacuate the Vidalia, Louisiana area by U. S. Highway 84 to Ferriday, then State Highway 15 to Sicily Island, Louisiana.

D. <u>Public Health Service Emergency Operation Headquarters</u>

In the event of an alert, the Weather Bureau contingent would evacuate and relocate to the Louisiana State Police Substation at Sicily Island in accordance with Louisiana's relocation plan. Meteorologists so evacuated would maintain surveillance over the affected area through helicopter observation.

The Weather Bureau contingent at the barge site Weather Station and the Medical Officer at the barge site Medical Aid Station would evacuate in accordance with the plan established by the Corps of Engineers staff working on the recovery operations. Depending upon the wind direction, the barge recovery task force would evacuate by automobile to St. Joseph via Vidalia or Old River Control Structure via Highway 15.

The Public Health Service Emergency Operation Headquarters staff would evacuate to Camp Beauregard, Pineville, Louisiana.

Relocation and Reception Centers

PHS Emergency Operation Headquarters, with the exception of Weather Bureau personnel, would relocate to Camp Beauregard, an approximate distance of 80 miles. Arrangements were completed to use the Civil Defense Headquarters located in Building 304 at the Camp. Communications from the relocation site would be by telephone, radio, TWX, and Western Union. At all times during the relocation, the Headquarters office would be in communication with the Mississippi National Guard and the Louisiana State Police.

The Weather Bureau contingent at PHS Emergency Operation Headquarters had relocation facilities at the Louisiana State Police Substation at Sicily Island. The Weather Bureau contingent from the weather station at the sunken barge site and the Medical officer at the Medical Aid Station would relocate with the Corps of Engineers recovery task force.

The Louisiana State Police would use the State Police Headquarters Substation at Sicily Island as a relocation site. The U. S. Coast Guard Communication Headquarters would relocate with the Louisiana State Police. The helicopters assigned to Louisiana, after flying predetermined routes to give warning, would relocate to Sicily Island.

The Vidalia Area Office of the Army Corps of Engineers would use St. Joseph as the relocation site. The Recovery Task Force, depending on wind direction, would relocate to St. Joseph or to the Old River Control Structure.

The Mississippi National Guard planned to use the National Guard Armory, Meadville, Mississippi as a relocation site. A room protected against chlorine gas was prepared in the Natchez Command Post allowing selected personnel to remain in the area should evacuation become necessary. All units would remain in communication with the Commanding General located in the protected room throughout the operation.

The American National Red Cross undertook the assignment of all matters pertaining to the reception, sheltering and feeding of evacuees. The Red Cross, working with State and local health agencies, also had the responsibility of staffing, supplying, and operating First Aid Stations along evacuation routes and at reception areas. All reception areas were located outside the periphery of the danger zone.

After determining the number of reception points involved in the operation, a disaster representative was assigned to each county in Mississippi and each parish in Louisiana. Local Red Cross officials used the resources of their chapters to apprise community leaders of the problem, and to enlist their support in organizing shelter plans.

Appropriate shelter locations, primarily in schools, were surveyed and requests were made to the county or parish superintendent of schools for the use of those selected buildings.

The Red Cross representative coordinated the reception center plan with the city and county or parish officials in the danger zone so that evacuation routes, selected shelter sites, communications, and warning would be well planned in advance.

The complete Red Cross plan for the counties and parishes involved would contain the following information: (1) list of shelters, (2) shelter managers and lunchroom supervisors, (3) number of cots and blankets for each shelter, (4) first aid supplies and names of first aid teams, (5) medical kits for nurses and names of nurses on call, (6) names of welfare inquiry registration teams, (7) narrative of events, (8) police protection at shelters, and (9) sanitation arrangements and supervision at each shelter.

There were 45 shelters stocked in Louisiana and 87 shelters stocked in Mississippi. First aid stations were located in communities having shelters and other stations were set up along the evacuation routes.

The American National Red Cross requested that cots and blankets from the PHS Civil Defense Medical Stockpile Depots be flown into the area rather than delivered by truck, as the rapid establishment of shelter capability was urgent. Consequently, PHS Emergency Operation Headquarters staff arranged for 22,477 cots and 44,440 blankets to be flown into the area. The U. S. Air Force was requested by the General Services Administration to furnish the airplanes. A total of thirty-two C119 and eight C124 aircraft were used for transportation of the cots and blankets. Some trucks were used from the Medical Stockpile Warehouse closest to the area.

Medical Preparedness

The accidental release of chlorine during removal of the tanks was unlikely. Still, there was an element of danger in salvaging four tanks containing 2,200,000 pounds of compressed liquid chlorine. The fact that the barge carrying the tanks had broken amidship, as it sank, and had been on the river bottom nineteen months added to the salvaging hazard. It was decided that every possible precautionary measure should be taken to safeguard the residents of the area. The medical and allied professions assumed responsibility for mass care and protection of the population.

The Boards of Health of both States assumed the responsibility of developing plans for health protection. The role of the Public Health Service was to assist in the preparation and implementation of these plans. Very early in the development of medical preparedness plans, health officials agreed that the maximum protection of the population in the event of a chlorine accident would be evacuation from the 30 mile danger zone. In view of this, it became necessary to establish shelters.

The American National Red Cross set up 132 potential shelters in the support areas surrounding the danger zone. Eighty-seven of these shelters were located on the Mississippi side; 45 on the Louisiana side. Modern school buildings with adequate facilities for food preparation and large areas that could be used for dormitories were selected as potential shelters. They were stocked with food, bedding and medical supplies. From previous experiences it was known that sanitation becomes a problem in a population sheltered in evacuation centers. Therefore a local health department sanitarian was assigned to every three shelters. He was to police his shelters, making sure that food was prepared under sanitary conditions, and that the sleeping and living quarters were kept decent and habitable. Plans were also made for the isolation of individuals who developed communicable diseases in these shelters. Around the clock nursing service for each shelter was scheduled by Red Cross nurses. Nurses, assigned to the shelters, were principally public health nurses and retired nurses living in the support area. Arrangements were also made with local physicians to make sick calls and ward rounds every day in the shelters.

A registration center was organized for each shelter, with a central register to be established in each community. An over-all master file was to be maintained at the Public Health Service Emergency Operation Headquarters.

Cots and blankets made available from PHS Civil Defense Medical Stockpile Depots were kept packaged at key locations for immediate distribution to the shelters in the event of a disaster. Medical supplies and comfort kits containing toilet articles were similarly stored.

Every hospital in the support area was briefed on the preparation and execution of an emergency preparedness plan. It was agreed that those individuals who became seriously ill in a shelter would be transferred to a local hospital along with any casualties.

The method adopted for treating chlorine poisoning was the one recommended by Dr. Joseph T. Noe, Medical Consultant to the Wyandotte Chemical Company. In brief, it consists of intermittent positive administration, by inhalation, of oxygen under 12 centimeters of water pressure with the use of a device known as a positive pressure inhalator. A potent bronchial dilator, a decongestant and vasoconstrictor, as well as a detergent for lowering the viscosity of bronchial secretions are used. These various agents are administered by means of a nebulizer which is

a component of the device. Twenty-five inhalators with adequate medications were placed at strategic points.

Classes were conducted in which physicians and allied medical personnel in the danger and support areas were given lectures and demonstrations on the treatment of chlorine poisoning, using the positive pressure inhalators. Abstracts of a scientific paper by Dr. Noe on the treatment of chlorine intoxication were distributed in each class.

In order to inform as many people as possible of the effects and treatment of chlorine gas, the Mississippi State Board of Health, with the permission of the Chlorine Institute, Inc., reproduced a bulletin from the Chlorine Manual entitled, "Medical Aspects and First Aid". Five thousand copies of this bulletin were distributed to physicians, public health workers, and others concerned in both States.

Early in the operation, it became evident that some type of protective air supplying equipment was needed for personnel at the chlorine recovery site. In order to fulfill this requirement, 80 M-15 breathing apparatus masks were obtained from an Army Supply Depot and assigned to the recovery task force.

It was determined at PHS Emergency Operation Headquarters that approximately 500 gas masks should be made available for use by security, fire and other key personnel who would be delayed in the event of mass evacuation. However, the Headquarters recommendation was not acceptable to some of the Mississippi State officials who insisted that gas masks be provided for all persons in the danger zone. Arrangements were made with Army Supply Depots to furnish the PHS Emergency Operation Headquarters with 42,587 M-9A1 gas masks and send personnel to supervise the fitting and instructing of recipients in the proper use of these masks. An officer and two enlisted men were assigned for this duty. (Figure 15: Issuing masks and instructions on their use at the Natchez auditorium.)

Two centers were established in Natchez and one in Vidalia for the issuance of gas masks. Each recipient signed a loan receipt making him accountable for the mask. Since there were no masks available for children, area evacuation plans remained unchanged.

Also, quite early in the planning, it was obvious that some type of protection was needed for groups of people that could not be evacuated. Consequently, 32 M-6 collective protectors were secured from Army Supply Depots and a representative from the Army Chemical Center was assigned to PHS Emergency Operation Headquarters to assist in their installation. Large rooms were sealed with masking tape and collective protectors were installed outside the buildings with inlet ducts leading into the rooms. By means of gasoline driven pumps, decontaminated air could then be filtered

into the rooms. The installation of several of these protectors in local hospitals, permitted sufficient areas to be isolated for the protection of patients and staff.

To further protect the recovery task force and others in the immediate vicinity, the Public Health Service established a Medical Aid Station at the barge site. A commissioned medical officer of the Public Health Service was assigned to the Station. Upon the physician's arrival, a large bus belonging to the Louisiana State Board of Health was obtained for use as the Aid Station and positioned at Morville Landing - five minutes by water from the barge site. Immediately, two collective protectors and an air conditioner were installed in the bus. The Station was furnished with two positive pressure inhalators and medical supplies. One of the helicopters equipped with an outside stretcher, assigned to Louisiana, was available to evacuate any injured person to a hospital.

The local medical staffs agreed to keep the daily census in the three hospitals in Natchez down to a minimum during the period of Operation Chlorine, chiefly by deferring elective surgery. The hospitalized patients would be taken care of in those hospitals with sections equipped with collective protectors.

As planning progressed, it was determined that it would be extremely difficult to safely move chronically ill and handicapped patients being cared for in homes in the event of a general evacuation. This group included those individuals with chronic disabling illnesses who were either bedridden or who could ambulate only with difficulty; it also included children and adults with serious handicapping congenital defects, mentally retarded individuals, and individuals with a previous history of severe mental illness.

The groups primarily concerned with the evacuation of the chronically ill and handicapped population, for the critical period of Operation Chlorine, were personnel of the local health and welfare departments. The individuals participating in this activity were divided into four sections: a registration section; a classification and assignment section; investigations section; and transportation section.

It was decided that three documents would have to be submitted for each individual who was to be evacuated. The first was a statement releasing any public agency or the Red Cross for damages resulting from untoward incidents which could possibly occur as the result of the evacuation. The second was a signed statement from the welfare department showing that the person requesting assistance for evacuation was actually in need of public assistance. The third was a signed document from the patient's private physician stating: the doctor's diagnosis; the patient's treatment and current medication; the doctor's opinion as to whether the patient could or could not be safely evacuated; and what type or method of transportation the doctor would recommend. It was the duty of the registration section to aid and assist the family of the chronically

Figure 13. Map of the Natchez evacuation plan.

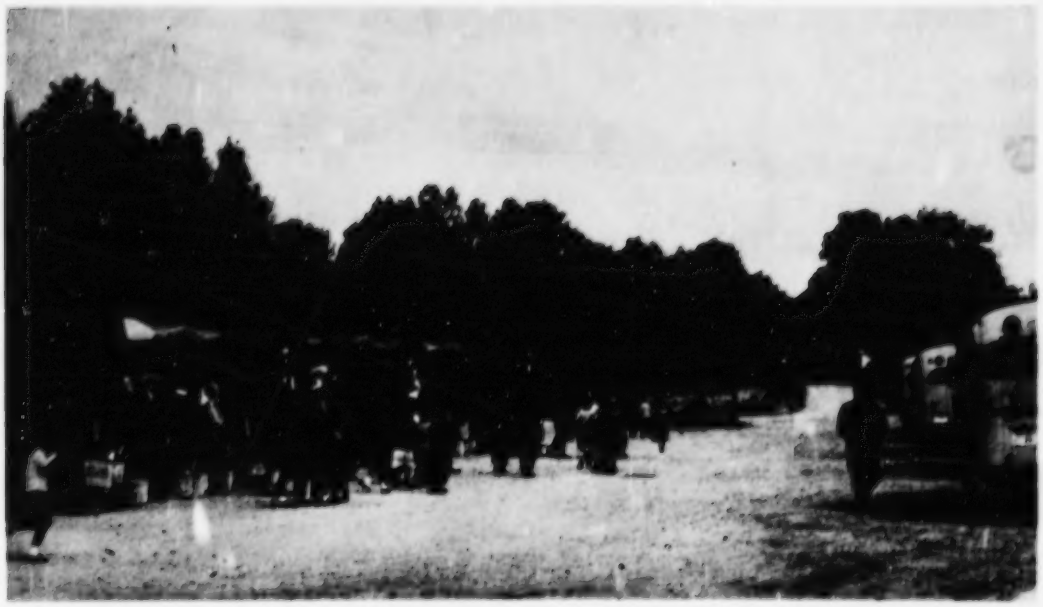


Figure 14. Practice exercise for the evacuation of a school in Natchez.

Figure 15. Issuing masks and instructions on their use at the Natechez Auditorium.

Figure 16. Evacuation of chronically ill and handicapped patients by helicopter.

Figure 17. Evacuation of chronically ill and handicapped patients by Mississippi Air National Guard Constellation.

ill or handicapped person in executing these three documents.

The major duties of the classification and assignment section were to classify all patients according to the most desirable type of transportation from the danger area, and to assign these patients to specific public-supported hospitals in the support areas. An attempt was made to match the patient's needs with the type of medical and nursing services offered by a specific hospital.

The major functions of the investigations section were to make home visits to patients to be evacuated, to notify them as to when and where they were going, what time they were to leave, and what type of transportation was to be used for them. This section also assisted the patient in securing and assembling the necessary toilet and personal articles he was to take with him, and also furnished nurses to accompany groups of patients to the various hospitals to which they were assigned.

The transportation section's main function was to secure transportation for all patients who had been processed by the classification and assignment section. It was also the duty of this section to see that each patient evacuated was properly tagged with identification and next of kin information, medical diagnoses, and current medications.

The classification and assignment section divided all patients into three categories. The first category consisted of the seriously or chronically ill patients who were not ambulatory. This category was further divided into two classes: patients whose life would be endangered if transportation outside the area were attempted; and patients who could be evacuated without endangering life, but for whom special types of transportation would be necessary. Category two consisted of the less seriously ill or handicapped patients who were ambulatory. This category was further subdivided according to the type of transportation that would be necessary for these patients. Category three consisted of patients who had a history of severe mental illness and those who were mentally retarded but without other serious handicaps.

Those few individuals who were in the first class of category one, and whose life would be endangered if evacuated from the area, were hospitalized at the three local Natchez hospitals which had been equipped with collective protectors. Plans then had to be made to evacuate the other categories and classes of patients to hospitals, sanitoriums, or nursing homes outside the danger zone. It soon became apparent that voluntary hospital beds within reasonable transportation distance would not be available to accept these patients and therefore a request was made to Veterans Administration to receive them. The Veterans Administration agreed to accept up to 225 of the chronically ill and handicapped patients.

Surveys showed that approximately 550 chronically ill and handicapped patients in the danger zone required evacuation. Of these, 298 were assisted in their evacuation by Federal and State agencies. Ambulances,

buses, helicopters, and a hospital transportation plane were used in the evacuation of this group of patients. (Figures 16, 17, and 18: The evacuation of chronically ill and handicapped patients from the danger zone.) The remaining identified chronically ill and handicapped patients were either financially able to make their own arrangements or refused assistance.

TABLE 1

ANALYSIS OF PATIENTS PROVIDED ASSISTANCE IN EVACUATION
DURING OPERATION CHLORINE

Chronically Ill or Handicapped Persons	Mississippi	Louisiana	Total
Transferred to Protected Hospitals in Danger Zone	15	0	15
Transferred to Nursing Homes, State or Local Supported Hospitals Outside Danger Zone	48	15	63
Transferred to Veterans Administration Hospitals	183	37	220
TOTAL ASSISTED IN EVACUATION	246	52	298

Table 1 shows an analysis of the chronically ill and handicapped patients who were assisted during their evacuation. A total of 15 patients were placed in hospitals with collective protectors; the balance were transported out of the danger zone - 15 to nursing homes, 16 to sanitariums, 32 to State hospitals, and 220 to Veterans Administration hospitals in Jackson, Biloxi, Alexandria, and Shreveport. Sixty-three percent of the 298 patients evacuated were female and approximately half of the patients were over 70 years of age.

During the 2½ to 3 week period of emergency hospitalization of the chronically ill and handicapped, 5 patients expired.

Security and Post-Evacuation Activities

A. Louisiana

After general evacuation was completed, the Louisiana State Police would man road blocks to keep anyone from returning to the disaster area. The State Police were prepared to send troops back into the disaster area with masks to form a roving patrol. Their responsibility would be to guard against theft and fire.

Seven teams, of two men each, from the Louisiana State Board of Health were assigned to return and monitor the danger area to determine when it would be advisable for the residents to return. This information would be transmitted to the PHS Emergency Operation Headquarters so they could announce the "All Clear".

Since no need for a general evacuation materialized, and only chronically ill and handicapped patients were evacuated, a plan was devised for returning the patients to their homes. Patients were returned from nursing homes by State ambulances, State Police buses, and private cars. Patients returning from the Veterans Administration Hospital used State ambulances and the Mississippi National Guard Airlift.

B. Mississippi

The Mississippi National Guard had a plan whereby certain areas in the downtown district of Natchez would be patrolled by two sentries on foot in each block to prevent theft. Other outlying areas would be protected by mobile patrols.

A Mississippi National Guard helicopter was stationed at the sunken barge site with the responsibility of following the chlorine gas cloud should one form and to keep the Commanding General informed.

A plan was developed to return the chronically ill and handicapped patients, who were evacuated from the danger zone, to their homes or Natchez hospitals. The patients were returned from the Veterans Administration Hospitals to Natchez by airlift. Remaining patients were returned by buses, ambulances and private automobiles.

Three monitoring teams were ready in Mississippi to monitor pre-designated areas and provide information to the Commanding General to allow him to advise the PHS Emergency Operation Headquarters so that an "all clear" could be announced. Ozone meters were acquired for use in monitoring.

C. The U. S. Coast Guard

The Coast Guard Communication Unit would resume communications from the relocation site as soon as the power unit reached Sicily Island. The communications truck would remain at this location until the "all clear" was given.

D. Public Health Service Emergency Operation Headquarters

After relocation to Camp Beauregard, the Headquarters office would resume coordination of the chlorine operation between the

two States. The activities of the Red Cross staff at Headquarters would increase due to relocation of residents of the disaster area. From the Weather Bureau relocation point, a meteorologist would fly over the danger area, utilising one of the Army helicopters, to keep the PHS Emergency Operation Headquarters informed of weather conditions in the area, as well as advised on the area covered by the chlorine gas cloud.

TERMINATION OF EMERGENCY

The emergency was terminated at 10:24 a.m., November 5, 1962, with the lifting and dispatch of the fourth chlorine tank out of the area.

Immediately, the plan for the return of the chronically ill and handicapped was put into effect. The return was completed by November 8.

The first call for the return of gas masks was issued on the day the emergency was declared ended. Preceding the raising of the last tank, Army Supply Depot representatives reported to PHS Emergency Operation Headquarters and remained in the area to assist in the collection and shipment of gas masks.

Collective protectors, positive pressure inhalators and other materiel obtained were collected and returned.

The weather unit was dismantled, equipment packed and personnel released.

The Medical Aid Station was closed and the bus in which it was housed was returned to the Louisiana State Board of Health.

The Red Cross returned all cots and blankets borrowed for their shelters to the Civil Defense Medical Stockpile Depots. Staff and equipment were released.

Manuals, reports, files and other materials relating to Operation Chlorine at PHS Emergency Operation Headquarters were packed and shipped to DHEW Region IV Office for use in the preparation of a report on the operation. The principal staff convened subsequently in Atlanta to prepare the preliminary draft.

The cost of Operation Chlorine to the Public Health Service, excluding regular salaries of permanent Federal employees was approximately $25,000 (salaries of temporary employees, overtime for Weather Bureau employees, travel and per diem, communications, printing, and supplies and materials). This cost includes the Weather Bureau since the cost of

their services for Operation Chlorine was financed by the Division of Air Pollution. Regular salaries of Public Health Service and Weather Bureau personnel stationed at PHS Emergency Operation Headquarters totaled approximately $20,000.

PROBLEMS ENCOUNTERED DURING OPERATION CHLORINE

1. Existing Federal legislation did not indicate which Federal agency should assume authority and responsibility for a hazard such as Operation Chlorine.

2. Underestimation of the potential Federal involvement and assistance required.

3. Early in Operation Chlorine, the chain of command among State and local agencies was not clearly delineated and in some instances, even after delineation, was not observed.

4. The best available information regarding the use of gas masks for the situation was not acceptable to the States involved.

5. Lack of adequate community preparedness to meet an emergency of major proportions.

6. Lack of operating funds in the States for this type of emergency.

7. Unavailability of State and local manpower because of involvement in a crisis elsewhere in the State.

8. Press information emanating from outside the immediate area dicrupted orderly development of public information plans of PHS Emergency Operation Headquarters.

CIVIL DEFENSE SIGNIFICANCE

Operation Chlorine demonstrated that Federal and State agencies can work together effectively to meet a potential disaster. But a prerequisite to effective working relationships is the establishment of the chain of command at the very beginning of preparedness planning and strict adherence to it. Equally important is the central coordination of all activities. The responsibility of each agency and its staff must be clearly delineated to avoid misunderstanding of the program authority vested in each organizational unit - otherwise certain activities can operate at cross purposes. In an emergency operation, the application of good management procedures is more important, perhaps, than in normal operations because there is no time for trial and error. Some of the basic management principles important in emergency operational planning are: effective communications;

delegation of responsibilities to the proper authorities; agreement on internal policies prior to public announcement; and concentration of efforts on key elements in the program.

Operation Chlorine supported the civil defense theory that capabilities will have to be built into a community, although in this situation the requirement was on a much smaller scale than would be demanded in the event of a national emergency. It was necessary to assign functions to people who were untrained and inexperienced; yet with a minimum of instruction they performed outstandingly. Too often in civil defense planning the potential of the people in a community or a region is grossly underestimated.

Operation Chlorine raised the question, "What is the role of the State or local Civil Defense Agency in an emergency situation?" In Louisiana the responsibility for program direction and coordination of the Operation was given to the State Police, State Department of Public Safety. In Mississippi this responsibility was assigned to the State National Guard. In both States, the Civil Defense Agency was responsible for necessary emergency planning and liaison with the various State agencies. It is believed that this assignment of responsibilities would occur in most States faced with a natural disaster situation. The State and local Civil Defense Agency should take the initiative in emergency planning and in overall coordination of other State agencies. But the implementation of emergency plans would have to be carried out by State agencies having funds, manpower, equipment and authority. In other words, Civil Defense agencies usually will not have operational responsibilities.

Apathy of the public has often been listed as one of the major problems in civil defense planning. Perhaps what appears to be apathy is the failure to individualize civil defense emergency planning and to make the individual feel that he is part of the program.

Another problem in communicating with the public develops when rumors circulate that are fictional or a distortion of fact. Counteracting the resulting confusion and misconceptions is best accomplished by using all available news media to issue the facts -- simply stated and frequently restated.

During the Operation, much of the manpower and materiel were brought in from outside the area. In a national disaster the community must rely, to a great extent, on its own resources. Operation Chlorine points up the urgency for communities to attain self-sufficiency by increasing local manpower capability and materiel reserves.

APPENDIX I

EXECUTIVE OFFICE OF THE PRESIDENT
Office of Emergency Planning
Washington 25, D. C.

Office of the Director September 10, 1962

MEMORANDUM FOR HONORABLE ANTHONY J. CELEBREZZE

Subj: Chlorine Barge Sunk in Mississippi River

Representatives of the Department of Health, Education, and Welfare, including Mr. Boisfeuillet Jones, Special Assistant to the Secretary for Health and Medical Affairs, have participated in a series of conferences, the most recent held September 6, at my office, concerning a very serious problem that results from the sinking of the non-self-propelled chlorine barge WYCHEM 112 in the Mississippi River approximately 7 miles southwest of Natchez, Mississippi, on March 23, 1961.

At the time of the casualty the barge was loaded with 2,220,000 pounds of liquified chlorine gas contained in four pressure-vessel cargo tanks set in saddle supports within the hopper space of the barge. We are informed that although the exact location of the sunken barge and cargo are not known, 2 sunken objects have been identified one mile apart, both under 15 to 20 feet of hardened sand and silt and approximately 10 feet of water, which is the low level for September.

This sunken barge and cargo present an inter-state health hazard of major disaster proportions. It is estimated that release of the cargo would result in 40,000 to 50,000 casualties in the area with 10,000 to 25,000 fatalities. The extreme dimensions of the problem necessitate immediate action by the Federal Government.

It appears that no single Federal agency has clear responsibility to remove or otherwise protect against this hazard. Also unresolved are legal questions as to the responsibilities of the private companies involved. On the other hand, it has been agreed that action cannot wait for resolution of such questions through normal processes. Therefore, the President has authorized me to direct those Federal agencies which have responsibility and competence in some aspect of this matter to take immediate and coordinated action to avert the possibility of a disaster through removal of the hazard and other necessary protective measures. I am requesting your Department, through the Public Health Service, to take primary responsibility for the public health and public information aspects of this operation. In essence this amounts to responsibility for all operational aspects other than the actual removal of the barge and contents and Federal governmental relationships with affected State political authority

and Congressional representatives. You are further authorized to draw upon the resources of any other Federal agency, such as the Army Chemical Center, the Office of Civil Defense, and the Weather Bureau, which have competence and resources that may be required. I have directed the Corps of Engineers to undertake the salvage operation, assisted by advice of the Public Health Service and others on safety aspects, and with authority to draw upon any other Federal agency with competence and resources that may be required. The Justice Department has been directed to assume responsibility for all legal aspects. The Office of Emergency Planning will be responsible for over-all direction and coordination.

You are authorized and directed to utilize any resources you have available for the purposes specified above. The question of additional budgetary requirements, if any, will be met when the nature and magnitude of the costs have been more clearly ascertained.

The Corps of Engineers has accepted its assignment and is making preparations at this time to proceed with the salvage operation. The public health and public relations aspects of the problem also require immediate attention. In order that all elements of the Government involved may be kept closely informed, I shall arrange for regular meetings, approximately on a weekly basis, in room 100 of the Executive Office Building, for the presentation of status reports and exchange of information among the interested parties. The Department of Justice will be represented at these meetings and you and your staff designee will be advised of the date and time of each meeting.

I will be available to meet with you at any time concerning any aspect of this problem and I am sure Mr. Jones will be able to answer any questions about actions taken to date.

Edward A. McDermott

Honorable Anthony J. Celebrezze
Secretary of Health, Education, and Welfare

APPENDIX I

EXECUTIVE OFFICE OF THE PRESIDENT
Office of Emergency Planning
Washington 25,D. C.

Office of the Director

September 7, 1962

Dear General Wilson:

Representatives of the Corps of Engineers and particularly Mr. M. S. Gurnee, Chief, Operations Division; Mr. J. J. Lankhorst, Assistant General Counsel; Mr. Earl Dominick, Chief, Miscellaneous Civil Branch, Operations Division, have participated in a series of conferences, the most recent held yesterday, concerning a very serious problem that results from the sinking of the non-self-propelled chlorine barge WYCHEM 112 in the Mississippi River approximately 7 miles southwest of Natchez, Mississippi, on March 23, 1961.

At the time of the casualty the barge was loaded with 2,220,000 pounds of liquified chlorine gas contained in four pressure-vessel cargo tanks set in saddle supports within the hopper space of the barge. We are informed that although the exact location of the sunken barge and cargo are not known, 2 sunken objects have been identified one mile apart, both under 15 to 20 feet of hardened sand and silt and approximately 10 feet of water, which is the low level for September.

This sunken barge and cargo present an inter-state health hazard of major disaster proportions. It is estimated that release of the cargo would result in 40,000 to 50,000 casualties in the area with 10,000 to 25,000 fatalities. The extreme dimensions of the problem necessitate immediate action by the Federal Government.

At the meeting held at my office yesterday, attended by representatives of the Corps of Engineers, Department of Health, Education, and Welfare, Public Health Service, Surgeon General's office, U. S. Coast Guard, Department of Justice, Bureau of the Budget and the White House, it was unanimously agreed that action to locate and remove the sunken barge and its cargo should be initiated immediately. The plan for removal should

afford the maximum possible protection to the public during the salvage operation. The Public Health Service, with the cooperation of the Army Chemical Corps, will cooperate closely with the Corps and other Federal elements participating in this effort. We can also call upon the Department of the Navy and the U. S. Coast Guard for such assistance and cooperation as may be desired.

A complete investigation of this incident has been conducted by the Coast Guard and all information developed to date is available from Rear Admiral O. C. Rohnke, Chief, Office of Merchant Marine Safety.

We recognize that jurisdictional responsibility of this salvage operation and the elimination of this grave hazard to public health is not clear. Federal response to the problem, however, can not wait on clarification of those questions. The situation is critical and action must be taken immediately, and it has been determined that the Corps of Engineers should assume primary responsibility for the salvage operations.

There are various legal questions involving the rights and obligations of the Federal Government and the responsibilities of the corporations having an interest in the barge and its contents. The Department of Justice participated in our discussions yesterday and will remain in close touch with all aspects of this problem as salvage operations develop.

Urging immediate action, I will appreciate your early acknowledgement of this assignment and assurances that the work will proceed. In order that all elements of Government involved may be kept closely informed I shall arrange for weekly meetings in room 100 of the Executive Office Building for the presentation of status reports and exchange of information among the interested parties. You will be advised of the date and time of these meetings.

I will be available to meet with you at any time concerning any problem that may arise in connection with this effort, and I am sure that Mr. Gurnee will be able to answer all questions on actions taken to date.

Sincerely,

Edward A. McDermott

Lt. General W. K. Wilson
Chief of Engineers
U. S. Army
Washington 25, D. C.

APPENDIX II

FEDERAL PERSONNEL ASSISTING OR REQUESTED BY PHS EMERGENCY OPERATION HEADQUARTERS

Department of Health, Education and Welfare - Public Health Service

Dr. Hugh B. Cottrell, Regional Health Director, DHEW Region IV
Dr. G. P. Ferrazzano, Chief, Division of Health Mobilization
Dr. Bobby G. Fulmer, Division of Hospitals, Outpatient Clinic, Mobile, Alabama
Dr. James McGee, Program Director, Community Health Service, DHEW Region IV
Mr. Richard W. Bowman, Executive Officer, Division of Health Mobilization
Mr. Walter C. Hughes, Health Mobilization Program Director, DHEW Region IV
Mr. Dawson T. Kilcrease, Health Mobilization Program Director, DHEW Region VII
Mr. Verne F. Fisher, Health Mobilization Officer, Louisiana State Board of Health
Mr. Howard W. Chapman, Associate Regional Health Director, DHEW Region IV
Mr. C. Bradley Bridges, Regional Training Consultant, DHEW Region IV
Mr. W. L. Nylander, Sanitation Specialist, Foreign Quarantine, DHEW Region IV
Mr. Joseph Schock, General Engineering Consultant, DHEW Region VII
Mr. W. B. Griffin, Sanitation Specialist, DHEW Region VII

Weather Bureau

Mr. Paul A. Humphrey, Research Meteorologist, Weather Bureau, Division of Air Pollution, Cincinnati, Ohio
Mr. Charles Hosler, Research Meteorologist, Weather Bureau, Sanitary Engineering Center, Cincinnati, Ohio
Mr. William F. Hilsmeier, Research Meteorologist, Weather Bureau, Research Section, Oak Ridge, Tennessee
Mr. John F. Clarke, Research Meteorologist, Weather Bureau, Division of Air Pollution, Cincinnati, Ohio
Mr. Walter M. Culkowski, Research Meteorologist, Weather Bureau, Research Section, Oak Ridge, Tennessee
Mr. Dave Slade, Research Meteorologist, Environmental Meteorological Research Projects, Office of Meteorological Research, Weather Bureau, Washington, D.C.
Mr. Anthony Giarrusso, Meteorological Technician, Weather Bureau
Mr. Harold E. Clark, Electronic Technician, Weather Bureau, Division of Air Pollution, Cincinnati, Ohio
Mr. Ralph Soller, Electronic Technician, Weather Bureau, Sanitary Engineering Center, Cincinnati, Ohio
Mr. Dee Witt Baulch. Sanitary Engineer, Weather Bureau, Division of Air Pollution, Cincinatti, Ohio
Mr. Russell Logaldo, Sanitary Engineer, Public Health Service, DHEW Region IV
Mr. Robert M. Buckley, Assistant Sanitary Engineer, Public Health Service, DHEW Region IV
Mr. Merrida Coxwell, Sanitary Engineer, Public Health Service, DHEW Region IV, Jackson, Mississippi
Mr. Milbourn Smith, Sanitary Engineer, Public Health Service, DHEW Region VII
Mr. Charles Coddington, Sanitary Engineer, Public Health Service, DHEW Region VII
Mr. Ken Kirkpatrick, Sanitary Engineer, Public Health Service, DHEW Region VII
Mr. William Buchholz, Sanitary Engineer, Public Health Service, DHEW Region VII
Mr. Russell Freeman, Sanitary Engineer, Public Health Service, DHEW Region VII

U. S. Army

Capt. Edward J. Browne, Army Chemical Center, Edgewood, Maryland
Mr. William Gross, Army Chemical Center, Edgewood, Maryland
Mr. Charles Ahlgren, Army Chemical Center, Edgewood, Maryland
Sgt. Glenn E. Taylor, Army Chemical Center, Edgewood, Maryland
Sgt. Burnis G. Neal, Army Chemical Center, Edgewood, Maryland
Sgt. Earnest Rawlings, Army Chemical Center, Edgewood, Maryland

Col. S. Julian Boyles, Chemical Corps, Third Army Headquarters
Maj. R. E. Bell, Chemical Corps, Third Army Headquarters

Mr. John H. Gardner, CBR Combat Development Agency, Ft. McClellan, Alabama
Mr. Arthur F. Reetz, CBR Materiel Requirements Group, Memphis Army Depot
Mr. Denver W. Traxler, CBR Materiel Requirements Group, Memphis Army Depot

Lt. Marshall H. Perkins, 22nd Special Warfare Aviation Detachment, Ft. Bragg
Lt. Austin R. Smith, 22nd Special Warfare Aviation Detachment, Ft. Bragg
CWO Louis Powell, 22nd Special Warfare Aviation Detachment, Ft. Bragg
CWO Landrum Trammell, 22nd Special Warfare Aviation Detachment, Ft. Bragg
Sgt. Charles R. Mathis, 22nd Special Warfare Aviation Detachment, Ft. Bragg
Sgt. Carrol J. Northington, 22nd Special Warfare Aviation Detachment, Ft. Bragg
Sgt. Joseph G. Keil, 22nd Special Warfare Aviation Detachment, Ft. Bragg
SP Valentine Raditic, 19th Psychological Warfare Company, Ft. Bragg
SP Robert N. Johnson, 19th Psychological Warfare Company, Ft. Bragg

Veterans Administration

Mr. Gene Duckett, Registrar, Alexandria Veterans Hospital
Mr. Andrew Landry, Administrative Assistant, Jackson Veterans Hospital

Office of Emergency Planning

Col. Walter D. Buie, OEP Region III Office

American National Red Cross (at Operational Headquarters)

Mr. W. D. Dibrell, Director, Disaster Services, Southeastern Area Office
Mr. W. P. Winters, Deputy Director, Disaster Services, Southeastern Area Office
Mr. W. C. Ross, Assistant Director, Disaster Services, Southeastern Area Office
Mr. Ralph Davis, Louisiana Disaster Representative
Mr. Eugene Jones, Mississippi Disaster Representative
Mr. Wilton Gaefe, Assistant Field Representative, Mississippi
Miss Ina Faircloth, Secretary, Southeastern Area Office

Coast Guard (Reported administratively to Army Corps of Engineers)

Personnel under the direction of Commander G. J. Bodie

APPENDIX III

OPERATION CHLORINE RUMORS

1. The operation was just a good excuse for holding a civil defense exercise.
2. The whole affair was to incite panic just as an experiment to see how people would behave.
3. All the chlorine had leaked out of the barge long ago and there was no danger.
4. There were large numbers of dead fish at the site, presumably killed by escaping chlorine.
5. An injunction was being sought to stop salvage operations.
6. The Government expects to sell the chlorine cargo at a profit.
7. Schools in Natchez will be kept open 9 hours per day, 7 days per week.
8. The Natchez-Vidalia bridge was being closed.
9. Chlorine would bleach everybody's hair white.
10. Before salvage operation for lifting first tank had started, it was heard that one tank had been raised and it was empty.
11. Just prior to raising of first tank, a man residing in the area of recovery operation came into Vidalia and spread the word that chlorine was leaking from the tanks now.
12. One person drove a car through Cloverdale Subdivision yelling that chlorine was escaping and almost started a panic.
13. Report was circulated that a number of hearses had been brought in to take care of casualties. (They were ambulances used to evacuate the chronically ill).
14. An old man reported that he had heard somebody had stolen the barge the night before and then commented, "some folks will steal anything".
15. A woman went to sleep with her gas mask on and smothered to death.
16. A man reported to his employer that he felt half dead from sleeping in his gas mask the past several nights.
17. The first tank raised was found to be filled with molasses.
18. The following comments were made about gas masks: (a) were no good, (b) were salvage - old and not used for anything, (c) were different from those issued to troops.
19. Before any plans for lifting were made, it was reported that the chlorine was being leaked into the river.
20. One diver was killed and another injured in the raising of the third tank. (No lost-time injuries occurred during the operation.)

APPENDIX IV

CALENDAR OF EVENTS LEADING UP TO OPERATION CHLORINE

3-23-61	Sinking of chlorine barge.
- - -	During summer and fall of 1961, Wyandotte Transportation Company endeavored to identify and determine condition of sunken barge but failed because the expected low water condition for that period did not occur.
11-14-61	Notice of abandonment filed by Wyandotte Transportation Company since it was determined that it was not feasible to salvage the barge and cargo.
7-11-62	Chlorine Institute and representatives of the Army Corps of Engineers and several other Federal agencies discussed the hazard of the sunken chlorine barge. (A Coast Guard representative chaired the meeting.)
7-26-62	Wyandotte Transportation Company was notified by the Army Corps of Engineers that the Corps could not accept the abandoned vessel, since it did not obstruct navigation.
8-7-62	Meeting attended by representatives of the Army Co. ps of Engineers, Coast Guard and other Federal agencies was held to discuss further the problem of the sunken chlorine barge. A representative of the Division of Environmental Engineering and Food Protection, Public Health Service, attended the meeting.
8-16-62	Meeting to continue discussion of chlorine hazard was held at Coast Guard Headquarters. Public Health Service was represented by staff members from the Divisions of Environmental Engineering and Food Protection and Air Pollution. The Chlorine Institute indicated it would assist in the disposal of liquid chlorine upon completion of salvage operations. Concern was voiced about the possibility of the release valve corroding before the tanks.
8-17-62	Division of Air Pollution advised Division of Health Mobilization of situation and scheduled subsequent meeting to discuss DHM responsibilities in the operation.
8-20-62	Health Advisor, Office of Emergency Planning, was advised by the Division of Air Pollution, PHS, of health hazard of sunken chlorine and requested to determine role of OEP in the matter.
8-21-62	Meeting attended by representatives of the Divisions of Air Pollution and Health Mobilization was held to outline program responsibility to be taken by the Division of Health Mobilization.

8-24-62 Natural Disaster Director, OEP, prepared memorandum stating that OEP did not have jurisdiction in this matter.

8-28-62 Health Advisor, OEP, requested that decision of Natural Disaster Director be reconsidered.

8-30-62 Director, OEP, was briefed by PHS personnel on the situation and data were given to him for consideration as to action to be taken.

9-6-62 A meeting was called by Director, OEP, to discuss assignment of responsibilities for removal of chlorine hazard. OEP, OCD, PHS, Coast Guard, Corps of Engineers, Bureau of Budget, Justice, Executive Office of President, and several other governmental agencies were represented.

In letter to the Secretary, DHEW, the Director, OEP, directed the Public Health Service to be responsible for public health and public information aspects. Department of Justice was to handle legal aspects. OEP was to handle over-all direction and coordination.

9-7-62 In letter to the Chief of Engineers, it was determined by the Director, OEP, that primary responsibility for salvage operations was to be assumed by the Corps of Engineers.

9-11-62 Briefing session held by the Army Corps of Engineers at Vicksburg was attended by Regional Health Director, DHEW Region IV. The Chlorine Institute, Wyandotte Chemical, OEP, and Mississippi and Louisiana Civil Defense agencies had representatives at the meeting.

9-13-62 Briefing of Director, OEP, on delegations and preliminary plans of action. Director, OEP, notified Governors of the chlorine hazard.

APPENDIX V

SUMMARY OF DAILY LOG ON OPERATION CHLORINE

September 16 - November 8, 1962

Sunday, September 16

Meeting was held at Vicksburg, attended by representatives of Army Corps of Engineers, Public Health Service, Office of Emergency Planning, and American National Red Cross, to discuss preliminary plans for Operation Chlorine. Organization and activities of the Corps of Engineers task force were reviewed. Plans were developed for constant monitoring around sunken barge site for the escape of chlorine through the use of ammonia hydroxide. Decisions made at the meeting were that Corps of Engineers would not proceed with any salvage operation until after consultation with the Public Health Service; that PHS representatives would set up headquarters in Vidalia area office of Vicksburg District Army Corps of Engineers; and, that plans for briefing session and press conference on following day would be carried out.

Monday, September 17

Corps of Engineers announced that divers had made positive identification of the sunken chlorine barge.

A meeting to brief Louisiana and Mississippi officials concerning the chlorine recovery operation was held in Vicksburg. State Board of Health, National Guard and Civil Defense representatives of both States and Natchez city officials attended the meeting. Presentations were made on the sequence of events leading to the present operation, delegation of responsibilities, engineering detection procedures, and characteristics and hazards of chlorine gas. A review was made of the capabilities and the services that could be provided by each of the State and Federal agencies represented. The group discussed the need for detailed emergency plans, problems of warning, and the issuance of daily bulletins. It was emphasized that the Public Health Service had a coordinating role in the public safety aspects of the operation but the local communities had the responsibility for development and institution of emergency plans.

A press conference was held in Natchez to which representatives from the area newspapers, radio and television stations were invited. The distribution of background data release and brief presentations by the Army Corps of Engineers and Public Health Service were followed by a question and answer period lasting for about half an hour.

Tuesday, September 18

In a meeting at New Orleans - attended by representatives of the State Board of Health, Civil Defense, National Guard, Adjutant General and State Police - a decision was made to place the responsibility for the Louisiana Operation Chlorine preparedness planning under the Department of Public Safety (which includes State Police). The group started immediately in the preparation of the disaster plan.

In a meeting in Jackson, attended by representatives of State Board of Health, Civil Defense Council, Department of Public Safety, State Highway Department, Department of Public Welfare, and National Guard, broad preliminary task proposals for each of the State agencies represented were presented and discussed.

Forty-five officials of the Mississippi State Board of Health staff were briefed on Operation Chlorine and advised that personnel would be reassigned as necessary to meet emergency requirements.

Wednesday, September 19

Plan was completed to release red smoke if chlorine should escape both as a warning and as a guide to wind direction.

State agencies in Mississippi continued preparation of Operation Chlorine preparedness plans. Mississippi Civil Defense Director requested 100,000 gas masks.

Louisiana Director of Public Safety reviewed and approved basic emergency plans and requested State agencies involved to complete annexes by end of following day. Request was made by the Director for 200 gas masks and three helicopters with sound equipment.

Natchez-Adams County Health Department staff was briefed on the chlorine hazard and the Public Health Service role in the operation.

Thursday, September 20

Radio communication with the barge operation was set up both in PHS Emergency Operation Headquarters and in PHS staff quarters.

The disaster plan for the Army Corps of Engineers salvage operation was completed.

The Corps of Engineers advised that barge was buckled and twisted and raising the barge itself was therefore ruled out.

Army Chemical Center arranged for the shipment of 20,000 gas masks to Natchez. Advice was received from Washington that this number was considered sufficient to meet the present situation.

Mississippi State Health Officer met with the President of State Medical Association, President of State Hospital Association and Red Cross representative to review chlorine hazard and medical aspects and requested and was assured assistance of the associations in meeting the potential danger.

Mississippi Civil Defense Director met with representatives of State agencies to further refine State emergency plan. Major concern was over reduction of gas mask request from 100,000 to 20,000. Consequently, the Army Corps of Engineers was requested by the Civil Defense Director to cease salvage operations until an adequate supply of gas masks was made available. Salvage operations were halted.

Friday, September 21

With approval of Chlorine Institute, information concerning medical aspects and first aid for chlorine gas was duplicated. A total of 5,000 reprints were divided between Louisiana and Mississippi for distribution to medical and allied health personnel.

Memorandum of understanding was signed by Mississippi Department of Public Welfare, Civil Defense Council, and American National Red Cross whereby Red Cross was given the responsibility for care of evacuees, should evacuation become necessary.

Arrangements were made for 18,877 cots and 44,440 blankets to be flown and trucked into Brookhaven, Jackson and Vicksburg from the Bastrop, Texas and Prairie, Mississippi Civil Defense Medical Stockpile Depots for distribution to shelter areas being set up in Louisiana and Mississippi by American National Red Cross.

A Public Health Service press briefing was held in Washington, D. C.

Plan for the Weather Bureau facility for Operation Chlorine was prepared.

Local officials in Adams and Wilkinson Counties, Mississippi were briefed on Operation Chlorine by representatives of State agencies.

Louisiana emergency plan was presented to officials of Concordia, Catahoula, and Tensas Parishes. Copies of Louisiana plan, hand-out materials, and press and radio releases were distributed.

At a meeting in the office of the Governor of Mississippi, the delegated responsibilities of the Army Corps of Engineers and the Public Health Service were outlined. The present status of chlorine recovery operation was reported. Consensus was that Federal assistance in both personnel assignments and Public Law 875 funds were necessary. The Governor directed the withdrawal of the salvage operation stoppage order of the previous day.

Saturday, September 22

Three National press representatives came to PHS Emergency Operation Headquarters and approximately ten newsmen telephoned for information.

Technical meeting, attended by representatives of Army Corps of Engineers, Public Health Service, U. S. Navy, Chlorine Institute, several chemical companies and several salvage companies, was held in Vicksburg to discuss methods of removing the chlorine hazard. After reviewing the various alternatives, it was the consensus that the safest approach was to raise the tanks individually and transport them by barge out of the area. The danger of having a torch coming in contact with the steel of the tanks themselves was emphasized since chlorine will make steel burn at 400°F.

Mississippi Civil Defense Director called meeting of representatives of State agencies to report that Mississippi Disaster Plan had been approved by the Governor and recommended that State agencies concerned establish operational headquarters in Natchez immediately. The Mississippi Civil Defense Council set up a press office in a room adjacent to PHS Emergency Operation Headquarters.

Public Health Service and Corps of Engineers developed procedure for issuing daily official Government press releases. Under the procedure, each agency would prepare a statement and the statements were consolidated into a single release; PHS Emergency Operation Headquarters would give copy of release to public information officers of Mississippi and Louisiana; and, Army Corps of Engineers Office would subsequently send release on a TWX to both Associated and United Press and the Natchez Democrat. PHS Emergency Operation Headquarters staff would participate in television, radio, and local organization presentations as requested.

Sunday, September 23

A public meeting attended by State and local representatives of Mississippi and Louisiana was held in Natchez. The Corps of Engineers gave a resume of salvage operations and presented a scale model exhibit. Specialists from the Division of Air Pollution, Public Health Service, discussed physical and toxicological actions of chlorine and activities to assist State agencies in providing all safety precautions

necessary for the protection of the population. A period of spirited questions and comments followed the formal presentations. Following this meeting a conference was held with the Mayor and the President of the Board of Supervisors to discuss the problem as it related specifically to the City of Natchez.

Monday, September 24

Red Cross reported that 87 fixed shelters had been established in Mississippi and 43 in Louisiana, all with provisions for sleeping, feeding and first aid care. Copies of shelter listings were made available to local officials. Thirty national staff members were brought in to assist local chapters.

State and local law enforcemnet officials of Louisiana met to begin development of annexes on communications, warning and evacuation. State Police distributed 15,000 handbills on Operation Chlorine to all schools in the three parishes involved. Louisiana opened its emergency headquarters in building adjacent to PHS Emergency Operation Headquarters and placed the Louisiana mobile communications center next to the emergency headquarters.

Arrangements were made between Louisiana public information officer and PHS Emergency Operation Headquarters for the release of official data and referral of requests for local information.

School officials in Louisiana requested 71 buses as necessary for evacuation plan for school children.

Representatives of State agencies briefed local officials of Jefferson County, Mississippi, on actions to be taken in connection with Operation Chlorine. Suggestions by PHS Emergency Operation Headquarters staff for changes in the Mississippi Disaster Plan were not acceptable to Mississippi Civil Defense Council.

Mississippi Board of Health and Red Cross completed arrangements for designation and establishment of medical aid centers in clinics or hospitals in ten communities outside the danger zone.

PHS Emergency Operation Headquarters completed and issued Operational Warning Plan to Mississippi and Louisiana officials.

Tuesday, September 25

Army Corps of Engineers issued statement that salvage operations would be on a 24-hour basis but that activities involving any increased hazard would be limited to daylight hours to provide safest possible working conditions and safest evacuation of residents.

Mississippi Civil Defense Director with concurrence of Army Chemical Center representative requested PHS Emergency Operation Headquarters to requisition: 20,000 additional gas masks; 500 canisters; and 12 collective protectors. Washington officials were advised of the additional request. (The 20,587 gas masks in the initial request had been received, stored, inventoried, and signed for by responsible agents).

Louisiana officials continued discussions of communications, warning and evacuation plans. Plans were completed for the establishment of police road blocks and traffic control. A siren was obtained for Vidalia. Letters to school superintendents and sheriffs in the three parishes in the danger zone were prepared. Meeting was held with Mayor and Board of Aldermen of Vidalia to develop local evacuation plans.

Camp Beauregard was selected as relocation site for PHS Emergency Operation Headquarters in case evacuation became necessary and Louisiana and Mississippi officials were so notified.

Meeting was held in Natchez attended by local medical society, hospital, health department, and Red Cross personnel relative to management of hospitalized patients. A briefing document on Operation Chlorine was distributed and a question and answer period followed. At the end of the meeting a Medical Planning Committee was appointed.

Wednesday, September 26

Washington requested justification for need for additional 20,000 gas masks and was advised that it was based on the assumption that with only two immediate outlet roads from Natchez, evacuation of the city would require 2½ to 3 hours and masks would be necessary for the interim period. The supplemental protective equipment requisition was placed.

Another siren was obtained for Vidalia, one was brought in for use in Tensas Parish, and arrangements made for 3 others to be brought in for use in the danger zone in Louisiana. Vidalia officials requested school superintendents to form car pools to the maximum extent possible for evacuation of children. Several school buses and several trucks were made available to Concordia Parish while the search for additional transportation units continued. Tensas Parish completed its local plan and distributed 5,000 copies to the citizens of the Parish.

Representatives from Mississippi local health departments and subsequently representatives from Mississippi Adjutant General's Office met with PHS Operation Headquarters staff for a briefing on present status of Operation Chlorine.

Thursday, September 27

Consultant to the Chlorine Institute was detailed to PHS Emergency Operation Headquarters to talk to medical groups concerning approved methods of treating chlorine gas victims. At his suggestion, PHS Emergency Operation Headquarters arranged for the rental and shipment of 25 positive pressure inhalators into the area to be used in the event treatment of persons overcome by chlorine gas became necessary.

Army Chemical Center sent a specialist to the area to advise and assist in the installation of the twelve collective protectors delivered to Natchez.

PHS Emergency Operation Headquarters was advised that Army helicopters could not be moved into the area until the National Guard of the respective States asserted that they did not have equipment available to meet the need. Mississippi National Guard advised that they had the helicopter equipment but had not been requested by the Civil Defense Council to make it available. Louisiana advised that they would issue a statement of non-availability of National Guard helicopter equipment.

An additional supply of 12 new 1½ ton trucks owned by the State were made available to Vidalia for possible evacuation need of adults from the area. Additional trucks were requested for evacuation needs of school children. Local emergency plans were completed and copies distributed in Harrisonburg, Ferriday, and Sicily Island. Emergency plans for the Dismal Swamp area were prepared and distributed by the Wildlife and Fisheries Commission. Assistance was provided in developing local plan for Jonesville. Operation Chlorine Emergency

Health Services memorandum was issued to key personnel in the three parishes.

Mississippi civil defense officials developed plan to issue gas masks to citizens on an individual memorandum receipt. Issuance would be from City Auditorium and Armory with instruction in their use provided on the spot by a three-man team from the Army Chemical Center.

Red Cross prepared and distributed plan showing to which shelters each school in the danger area would evacuate.

Representatives of Mississippi State Highway Department met with PHS Emergency Operation Headquarters staff for an up-to-date briefing on Operation Chlorine.

Friday, September 28

Governor of Louisiana visited PHS Emergency Operation Headquarters and was shown scale model of sunken barge, Weather Bureau equipment, and Red Cross operation and was told about the responsibilities and services to be provided by the Public Health Service. The Governor said he was very pleased with the progress of the cooperative operation between State and Federal agencies and reported that the State Legislature had made $50,000 available for costs involved in evacuation should it become necessary.

Local emergency plans for Vidalia and Jonesville were finished. This completed the preparation of all emergency plans for all three parishes and all major towns in the danger zone in Louisiana.

Louisiana State Board of Health field director for Operation Chlorine and members of local health department staff met with PHS Emergency Operation Headquarters staff to review completed Louisiana medical preparedness plans. This covered stand-by personnel; acquisition of medical supplies for medical aid stations and for physicians offices along evacuation routes; location listing of resuscitators and oxygen near each shelter area; plans for litters for movement of invalids from nursing and private homes.

Final draft of Medical and Health Annex to Mississippi Operation Chlorine Disaster Plan was distributed.

Chlorine Institute consultant demonstrated use of positive pressure inhalators to physicians in Natchez-Adams County.

Scientist from Chemical, Biological, and Radiological Agency discussed with PHS Emergency Operation Headquarters staff the variables in downwind spread of chlorine caused by such factors as terrain, wind current and other meteorological conditions.

Weather Bureau monitoring operation was placed on an around-the-clock basis.

Saturday, September 29

Mayor of Natchez called two public meetings to give the citizens information on Operation Chlorine. The public was told that although the possibility of danger was remote, every possible precaution for the welfare and protection of the population in the danger zone was being taken. Functions and responsibilities of each State agency in Operation Chlorine were outlined. Public was advised that advance notice would be given of any increased hazard over that already existing. About 150 people attended the morning meeting and 85 the afternoon meeting.

Copies of the drafts of the Mississippi Basic Operation Chlorine Plan, Emergency Welfare Plan, Warning Plan Annex, and Natchez Area Evacuation Plan were unofficially made available to PHS Emergency Operation Headquarters.

All key Red Cross personnel involved in the operation were briefed by PHS Emergency Operation Headquarters staff on the current status of the chlorine recovery activity and questions raised by the group were answered.

Sunday, September 30

The Mississippi Civil Defense Director directed the cessation of chlorine salvage operations because of the federalization of the Mississippi National Guard. It was explained that this action was taken inasmuch as the Mississippi National Guard was necessary for evacuation and traffic control in the event of accidental discharge of chlorine gas. The Civil Defense Director was advised by the Corps of Engineers and the Public Health Service that since present activities in the chlorine tank recovery plan consisted only of dredging, with no increase in the existing hazard, this preliminary operation would continue.

PHS Emergency Operation Headquarters recommended against the requisitioning and installation of additional collective protectors.

Monday, October 1

In a series of telephone calls involving Washington officials and the Mississippi Civil Defense Council staff, PHS Emergency Operation Headquarters ascertained that, for Operation Chlorine, an estimated 2,500 Mississippi National Guardsmen would be required. Procedures were initiated in Washington to obtain the deployment of this number of Guardsmen to Natchez.

Civil Defense Director of Adams County advised that local emergency plans could not be completed without knowing that National Guard personnel would be available. No progress was made in completing Adams County plans at a meeting of local officials. It was reported that due to failure to designate engineers to man the protectors at proposed installation sites in Mississippi, only four collective protectors had been installed. Since the technician from the Army Chemical Center could stay for only a short time, arrangements were made with the Adams County Civil Defense Director to speed up the installation.

A conference was held with Coast Guard staff to develop plans for the Coast Guard to fulfill its responsibility for warning river traffic of the hazard of the occurrence of accidental release of chlorine gas. After discussion of various aspects of warning and protection, a proposed plan was written and concurrence obtained.

Action was initiated to secure an Army ambulance for location across from the chlorine recovery site for emergency use. Red Cross placed purchase orders to augment first aid medical supplies in their shelters.

PHS Emergency Operation Headquarters was formally presented with copies of Mississippi Disaster Plans and Annexes prepared to date.

The Third Army Headquarters assigned a liaison officer to PHS Emergency Operation Headquarters to handle contacts with military personnel and installations.

Tuesday, October 2

All underwater salvage operations were ordered halted by the Secretary of the Army until Mississippi officials agreed that they were prepared to meet a potential emergency in the chlorine recovery operation.

Telephone conversations with Washington officials continued relative to making Mississippi National Guardsmen available for Operation Chlorine. Discussions pertained to requirements in terms of number of troops, number of vehicles, number of helicopters and types of other special equipment. It was pointed out that salvage operation would have to be held up until National Guard troops were made available. Late in the day, report was received that agreement had been reached in Washington to defederalize 2,500 members of the National Guard for the purpose of handling the Natchez situation.

Mississippi Department of Public Welfare established a position that they would oppose the evacuation of children without the written approval and consent of the parent or guardian.

Final copies of PHS Emergency Operation Headquarters Communication Plan and U. S. Coast Guard Plan for Management of River Traffic were supplied to Louisiana and Mississippi officials.

Red Cross prepared and distributed official Red Cross shelter lists for Louisiana and Mississippi showing shelters, shelter managers, first aiders, physicians and nurses with corresponding telephone numbers.

Issuance of gas masks to citizens of Natchez was started.

Wednesday, October 3

Advice was received that Secretary of the Army was prepared to defederalize National Guard troops to the Natchez area but was awaiting a request for this action from the Mississippi Governor.

The following items were requested from military sources: three helicopters with sound equipment and two extra sound units for use in Louisiana; 50 compressed air breathing apparatus units for use at the recovery site; four collective protectors to be used at the recovery site; and 2,000 additional gas masks for issuance in Vidalia.

A representative of Mississippi Civil Defense Council requested PHS Emergency Operation Headquarters to obtain buses for evacuation of school children. He was advised that Mississippi Adjutant General had stated that National Guard had adequate transportation equipment.

PHS Emergency Operation Headquarters issued statement that the responsibility of advising tourists of the chlorine hazard rested on motel and hotel operators.

Because of difficulty of radio contact between Coast Guard Emergency Check Point Stations and the Army Corps of Engineers, it became necessary to alter plans for Coast Guard communications.

Thursday, October 4

Mississippi Governor officially requested of the President that National Guard personnel be made available for Operation Chlorine and that the Federal Government assume the full financial cost. The Deputy Director of Office of Emergency Planning in his reply stated

that no commitments could be made in respect to assumption of costs by Federal Government for State personnel. He added, however, that OEP was prepared to work with the Governor and other State officials in an effort to find a satisfactory solution.

Meeting was held with school officials of Natchez and Adams County. Public Health Service delineated its responsibilities and presented facts regarding the medical and physical aspects of chlorine. Army Corps of Engineers described some of the elements of salvage operation, gave projected timetables and emphasized that recovery operations would be performed around the clock seven days a week but that more hazardous phases would be performed during daylight hours. It was also emphasized that no one could predict if or when gas might escape and therefore evacuation of children must be planned both while at school or out of school. School officials said that plans for transportation and warning would be worked out with the National Guard as soon as they became available.

Specialist on collective protector installation from Army Chemical Center advised that Natchez City engineer had been instructed in proper operation and maintenance of air purifying machines and the proper preparation, operation and maintenance of the shelters. Similar instruction had been given to Safety Engineer at the chlorine recovery site.

Medical Officer on assignment from PHS Division of Hospitals reported to PHS Emergency Operation Headquarters with the specific mission of establishing and manning a Medical Aid Station at the sunken barge site.

Weather Bureau completed arrangements for providing weather predictions to Corps of Engineers staff at barge site operation.

Personnel of the salvage companies arrived in the area.

Friday, October 5

A meeting was held in Vicksburg, attended by representatives of Army Corps of Engineers and Public Health Service and by the Mississippi Civil Defense Director in an endeavor to obtain approval to proceed with salvage operations. Subsequently, meetings attended by the above group were held in Jackson with the Adjutant General, the Governor's Executive Officer and the Governor concerning the resumption of operations. The Governor stated that he had not issued the cease operation order and therefore could not give the commence operation order.

Positive pressure inhalators finally arrived after several days delay in transit. Medical consultant to Chlorine Institute gave three lectures and demonstrations on their use to groups of physicians in the area.

A representative of the Dow Chemical Co. reported to PHS Emergency Operation Headquarters that he had spent several days checking safety procedures in connection with raising of the chlorine tanks. He stated that he had discussed in detail with Corps of Engineers and salvage company personnel procedures to be followed in using of torches, handling of tanks during raising, and safety precautions to be followed after tanks are out of water.

Mayor of Vidalia visited PHS Emergency Operation Headquarters to express concern over undue delay in salvage operations since Louisiana had been fully prepared for a week. He was briefed on the Mississippi problem.

Plans were completed to purchase emergency medical supplies to equip the Medical Aid Station at the chlorine recovery site.

Saturday, October 6

Army Corps of Engineers and PHS Emergency Operation Headquarters staff met to draft and transmit a telegram to the Governor of Mississippi requesting his approval to resume salvage operations.

Distribution of gas masks to citizens of Vidalia was initiated. This action had become necessary because of public pressure stemming from the issuance of masks to citizens of Natchez across the river.

Arrangements were completed to use the Louisiana State Board of Health bus to house the Medical Aid Station at the chlorine recovery site.

Sunday, October 7

Members of PHS Emergency Operation Headquarters staff visited the Coast Guard check point stations to observe operational plans. It was agreed that the Coast Guard would adopt the Corps of Engineers Disaster Plan in case of an emergency.

Request was placed for military red smoke generator to replace smoke bombs inasmuch as the generator provides a long smoke signal period. Brilliant red flares were also requisitioned.

Initial draft of the PHS Emergency Operation Headquarters Relocation Plan was prepared.

Monday, October 8

PHS Emergency Operation Headquarters instituted procedure of presentation of a Weather Bureau briefing each morning at 8:30 a.m. Discussion was held to formulate relocation plan for Weather Bureau in the event of chlorine gas escape and to outline postdisaster activities of Weather Bureau personnel.

Instructions in use of positive pressure inhalators was given by Medical Officer of the Medical Aid Station to physicians in two Louisiana townships who were to man medical aid stations along evacuation routes in the event of an emergency.

Arrangements were completed to transfer 750 gas masks from Natchez and to assign 500 to the Coast Guard for issuance to river traffic and to assign the other 250 to the Louisiana State Police for issuance and use by citizens residing near the chlorine recovery site. Gas mask size exchanges between Natchez and Vidalia were also arranged.

Tuesday, October 9

President of Homochitto Valley Medical Association and Administrator of Jefferson Davis Hospital visited PHS Emergency Operation Headquarters and the sunken barge site. They praised the medical precautions being taken for Operation Chlorine. PHS Emergency Operation Headquarters was also visited by the Adjutant General of Louisiana.

As a result of a meeting between Corps of Engineers and PHS Emergency Operation Headquarters staff concerning emergency warning plans, Corps of Engineers considered a revision in their Disaster Plan for Operation Chlorine necessary.

Natchez-Adams County Civil Defense Director was requested and subsequently prepared a letter urging the evacuation of indigent chronically ill patients from the area prior to the lifting of the chlorine tanks.

Two Louisiana officials expressed concern to PHS Emergency Operation Headquarters over the delay being caused by the work stop order.

Wednesday, October 10

The President, invoking provisions of Public Law 875, determined that the potential hazard to health and safety, in those areas of Mississippi located in the vicinity of the barge, threatened to be of sufficient severity and magnitude to warrant disaster assistance by the Federal Government to supplement State and local efforts.

Executive Assistant to the Governor of Mississippi met with the Mayor of Natchez, other city officials, and representatives of PHS Emergency Operation Headquarters to review present status of Mississippi activities in connection with Operation Chlorine.

Three helicopters with a staff of three pilots and six mechanics and maintenance personnel arrived in Vidalia. Understanding was obtained that operational control of the helicopter activities would be exercised by Louisiana State Police Emergency Headquarters.

PHS Emergency Operation Headquarters suggested that the Mississippi and Louisiana State Boards of Health designate and instruct members of their staffs, possibly from Environmental Engineering, to develop plans for postdisaster monitoring in case of a chlorine leak.

Division Engineer, Army Corps of Engineers, visited PHS Emergency Operation Headquarters and went over State emergency plans developed to date in very careful detail.

Thursday, October 11

The Governor of Mississippi issued a proclamation directing all state agencies to make personnel, supplies and equipment available for Operation Chlorine and designated the Adjutant General of Mississippi to serve as overall control and coordinating authority for the Operation.

Advice was received that Louisiana would not request P.L. 875 assistance.

Meeting attended by PHS Emergency Operation Headquarters and Red Cross staff was held at Adams County Health Department to discuss the problem of indigent chronically ill and handicapped patients. It was agreed that these patients be evacuated, prior to lifting operations, because of the difficulty of moving them in the event of an emergency. Need for signed release forms was pointed out. It was agreed to establish a central registry of patients evacuated, to be maintained in the Adams County Health Department.

Thirty additional compressed air breathing apparatus were requisitioned for use at the recovery site.

Helicopter pilots surveyed the danger area in Louisiana and mapped out their warning operations.

Friday, October 12

Director of Office of Emergency Planning and members of his staff, Deputy Chief of Army Corps of Engineers, Department of Health, Education, and Welfare Special Assistant for Health and Medical Affairs, and the Vice President of American National Red Cross visited PHS Emergency Operation Headquarters, the tank recovery operation, and other area activities concerned with Operation Chlorine. A luncheon meeting was attended by the above group, by PHS Emergency Operation Headquarters staff, and by State and local officials from Mississippi and Louisiana.

Request was placed for 6 additional collective protectors for Natchez.

Individual issuance of gas masks to residents in Louisiana in the proximity of salvage operation was initiated.

PHS Emergency Operation Headquarters received copies of the revised Disaster Plan of the Army Corps of Engineers, dated October 10.

Saturday, October 13

Official directive received from Washington to resume salvage operations at 8:00 a.m., October 14.

Two officers of the Mississippi National Guard, assigned as liaison to PHS Emergency Operation Headquarters, reported and were quartered in the adjacent room formerly used by the public information officer of the Civil Defense Council. An understanding was reached that all Federal news releases would be in official channel if given to the liaison personnel.

Mississippi National Guard requested that 2,500 sleeping bags with air mattresses be requisitioned from military sources.

Radio communication details of salvage company and Coast Guard were prepared. Decision was made to install direct warning telephone line from PHS Emergency Operation Headquarters to National Guard Headquarters in Natchez Armory.

Staff members of PHS Emergency Operation Headquarters, Adams County Health Department, and Red Cross met to discuss problems involved in moving indigent chronically ill and handicapped patients from the area or to quarters covered by collective protectors. Urgency of moving these patients promptly was stressed. Adams County Health Department representatives were requested to prepare analysis of patients to be moved and determine total needs for a meeting on the following day.

Sunday, October 14

Final draft of PHS Emergency Operation Headquarters Relocation Plan was prepared, duplicated and distributed.

Previously scheduled meeting was held to discuss evacuation of chronically ill cases from the Natchez area. State or community hospital facilities were not available to handle the estimated 225 patients to be evacuated. PHS Emergency Operation Headquarters was requested to: (1) try to obtain hospital space from the Veterans Administration or arrange for Red Cross to lease a facility outside danger area with Mississippi State Board of Health providing personnel for medical care; (2) arrange for Mississippi National Guard to provide patient transportation.

The two extra loudspeakers, accompanying military helicopters to Louisiana, were made available for use in Mississippi National Guard helicopters.

Two military officers from the Pentagon visited the area to prepare an on-the-spot report on Operation Chlorine. PHS Emergency Operation Headquarters reviewed the status of preparedness operations in the two States and outlined the services being provided under the Public Health Service delegation.

Salvage operations were resumed by the Army Corps of Engineers.

Monday, October 15

Veterans' Administration was contacted concerning possibility of space being made available in its hospitals for chronically ill patients

to be evacuated from the danger zone. The problem of VA reimbursement for nonbeneficiaries was referred to Office of Emergency Planning for resolution.

PHS Emergency Operation Headquarters staff met with National Guard officers and the Mississippi Governor and members of his staff to review Mississippi National Guard plans for evacuation, warning and emergency transportation. Adjutant General advised that additional annexes would be added by the following day and copies of the consolidated disaster plan supplied to PHS Emergency Operation Headquarters. Following the meeting, the Governor of Mississippi made a tour of PHS Emergency Operation Headquarters.

Arrangements were initiated for Mississippi National Guard to provide buses, ambulances and aircraft for the evacuation of chronically ill patients. First aid kits to be carried on transportation units with patients were obtained from Jefferson Davis Hospital.

Request was made by Mississippi National Guard for two military helicopters equipped for medical evacuation.

Gas masks were made available for local policemen in towns in the three Louisiana parishes.

Arrangements were made to detail a medical officer from the Mississippi National Guard to the Adams County Health Department to assist in the evacuation of chronically ill patients.

Instruction on methods of therapy for chlorine inhalation was reproduced and distributed to physicians in Mississippi and Louisiana.

Natchez Garden Club called concerning advisability of the Delta Queen, a river steamer, with sightseers from Cincinnati stopping in Natchez for a tour of the homes on October 25. Cancellation of plan was recommended.

Tuesday, October 16

Advice received that all clearances had been made in Washington for use of Veterans Administration hospitals in Mississippi and Louisiana to take care of up to 225 chronically ill persons to be evacuated from the Natchez area.

Notification was received that two helicopters for medical transportation would arrive on the following day.

Louisiana State Police requested, in addition to a press release, that a short bulletin be issued each morning and each afternoon that could be sent out by radio to sheriffs' offices so they, in turn, could inform residents in their areas of the progress of the tank recovery operation. PHS Emergency Operation Headquarters agreed to work out details for implementation of the plan with the Corps of Engineers.

A request for 10 additional collective protectors was placed.

Wednesday, October 17

Meeting was called by Louisiana State Police, attended by sheriffs and mayors from the three Louisiana parishes and townships and Corps of Engineers and PHS Emergency Operation Headquarters staff, to iron out remaining problems in connection with Louisiana Operation Chlorine Plan. Subjects discussed were: time schedule for operation of helicopters; maintenance of transportation vehicles in a constant state of usability;

management of jail inmates; extent of protection provided by gas masks; warning plan both at moment of and subsequent to possible chlorine escape; and should gas escape, how the safety for reentry would be determined.

Louisiana State Police developed and distributed their Emergency Headquarters Evacuation and Relocation Plan.

Louisiana Emergency Health Field Director notified hospital administrators of some 27 hospitals in a wide radius outside the danger zone to be alert and prepared for the possibility of receiving chlorine casualties from disaster area in event of an accident.

Representatives from Alexandria and Jackson Veterans Administration Hospitals arrived in the area to assist in evacuation of chronically ill patients to VA facilities.

Twenty-one Mississippi patients were taken by National Guard bus to Mississippi State Hospital in Whitfield.

Thursday, October 18

Plan for issuance of bulletins at 9:00 a.m. and 3:30 p.m. daily was inaugurated by PHS Emergency Operation Headquarters following discussion and acceptance by public information officers of Army Corps of Engineers, Louisiana State Police and Mississippi National Guard.

At the invitation of the Army Corps of Engineers, news media representatives from seven television stations, eight newspapers and two national magazines visited the area. News representatives were given briefing documents and arrangements were made for them to visit the salvage operation. They were advised that once the tank raising operation started, the area close to the salvage activity would be closed to newsmen.

Mississippi Air National Guard evacuated 54 chronically ill patients by Constellation airplane to the Jackson Veterans Administration Hospital. Fifteen patients who were considered physically unable to be moved out of the area were placed in Natchez hospitals where collective protectors were available.

Installation of additional collective protectors obtained was completed and inspection made by Safety Officer of Army Chemical Center.

Mississippi National Guard requested that the following supplies be obtained for them: 50 general purpose tents, 350 tent stoves and 10,000 "C" rations.

Friday, October 19

Removal of deck fixtures and operating platform from over the chlorine tanks was completed.

PHS Emergency Operation Headquarters staff visited National Guard Headquarters to tour operations. Adjutant General stated that Mississippi was now fully prepared for Operation Chlorine. Subsequently, staff members attended the press conference held by National Guard personnel.

Coast Guard issued special warning information to river traffic on dangers involved in Operation Chlorine. Direct telephone communication was established with Coast Guard check points in order to strengthen monitoring of river traffic.

Chronically ill patients in Mississippi were moved from the area as follows: 12 by National Guard bus and 4 by ambulance to Mississippi TB Sanitarium, 11 by ambulance to Vicksburg Charity Hospital and 12 by helicopter to Alexandria Veterans Administration Hospital.

A total of 3,600 additional cots were requisitioned from Bastrop, Texas, Civil Defense Medical Stockpile Depot for use by Red Cross in setting up additional shelters.

Revised Operational Warning Plan for PHS Emergency Operation Headquarters was distributed.

Saturday, October 20

All State and local Operation Chlorine plans and annexes in Louisiana were reproduced and assembled into one manual for distribution to key officials.

Representatives of PHS Emergency Operation Headquarters and Mississippi National Guard met with Mayor and Sheriff of Natchez and Adams County Civil Defense Council to advise city authorities against testing newly installed sirens as publicized; there was a danger that the sirens could cause panic. It was agreed not to do any testing.

Mississippi Air National Guard Constellation took 24 chronically ill Mississippi patients to Alexandria VA Hospital and 48 patients to Biloxi VA Hospital.

Mississippi Adjutant General made a tour of PHS Emergency Operation Headquarters.

Sunday, October 21

PHS Emergency Operation Headquarters officially advised the Army Corps of Engineers that operational safety plans for any emergency which might occur in the recovery of the sunken chlorine tanks had been developed and implemented in both Louisiana and Mississippi, and that evacuation of chronically ill patients would be completed the following day.

Thirty-four (34) Louisiana patients were taken to Alexandria VA Hospital by ambulance, by State police bus, and by private vehicles. Louisiana reported that 9 patients had been sent to Tallulah Nursing Home, 4 to Rosalee Nursing Home and 2 to Comfort Cottage.

Mississippi Air National Guard Constellation took 33 chronically ill Mississippi patients to Shreveport VA Hospital and 2 patients were taken by ambulance to Alexandria VA Hospital.

Public information officer of Army Corps of Engineers met with PHS Emergency Operation Headquarters staff to finalize plans to give PHS 24 hours advance notice before strongback is put into position over each tank so that immediate news issuance to the public could be made.

Monday, October 22

Press conference was held in Natchez to brief news media representatives on activities to date and explain plans for recovery operation. Preparedness plans were reviewed. Announcement was made that Corps of Engineers boat would be available to newsmen for coverage of the lifting operation but roads into area would be closed during the raising of the tanks.

Mississippi National Guard, with Coast Guard concurrence, agreed to fly planes over the Mississippi River to warn small boat traffic without radio communication in the vicinity of chlorine recovery operation. Request for two loudspeakers was made from the military.

Mississippi sent five chronically ill patients by helicopter to Biloxi VA Hospital and three by ambulance to Alexandria VA Hospital. Louisiana sent three chronically ill patients by ambulance to Alexandria VA Hospital.

The salvage company contractors prepared and distributed an emergency plan for their operation during the removal of the chlorine tanks.

Mississippi National Guard raised question of advisability of starting chlorine tank lifting operation while children are on way to school. Corps of Engineers agreed that hoisting would not begin until school was in session.

Red Cross, working with representatives of Amer. Tel. and Tel. and Western Union, completed the communications setup at the relocation site for PHS Emergency Operation Headquarters, which included installation of TWX, Western Union and PBX equipment. An operational guide for the Emergency Communication Center was prepared.

Tuesday, October 23

Evacuation of chronically ill patients in the danger zone was completed with the transport of two persons by ambulance to Alexandria VA Hospital.

Medical Officer at PHS Medical Aid Station completed instruction of hospital staffs in the area on the use of positive pressure inhalators and collective protectors.

Weather Bureau completed and submitted annex on Weather Bureau facilities and staffing as part of PHS Emergency Operation Headquarters plans.

Coast Guard advised that stop orders were being issued to upriver traffic at 6:00 p.m. and downriver traffic at 3:00 a.m. (October 24) as precaution to raising of first tank.

Wednesday, October 24

Raising of chlorine tank No. 1 began at 2:49 p.m. and the tank was in place on cradle barge at 4:09 p.m. River traffic resumed at 4:25 p.m. Decision to raise tank so near to school closing was made since the wind direction was away from all school areas. Twenty-five news representatives were aboard the Corps of Engineers boat to observe the lifting operation.

Prior to raising operations, a test was made of the telephone warning communication system.

Advice was received of urgent military need for all unissued gas masks. Arrangements were made for the Mississippi National Guard to transport the 8,004 unissued gas masks to the Memphis Army Depot.

Meeting, attended by Veterans Administration, Health Department, National Guard and PHS Emergency Operation Headquarters personnel, was held to discuss plans for the return of chronically ill and handicapped patients following the raising of the fourth tank. A general plan was written and distributed.

Mississippi National Guard requested 230 stove pipe shields and 100 air conditioning elbows from military supply.

Natchez Garden Club was advised that no increased hazard would exist on October 25 if the Delta Queen wished to dock in Natchez so passengers could make tour of homes.

Thursday, October 25

Passengers on board Delta Queen were issued gas masks upon leaving the boat, were told of the chlorine hazard, and were shown how to use the masks.

Mississippi National Guard agreed to provide transportation for the return of chronically ill patients for both Mississippi and Louisiana.

Two representatives from the Communicable Disease Center reported to PHS Emergency Operation Headquarters with the mission of taking film to be used in the preparation of a PHS documentary film on Operation Chlorine.

Friday, October 26

Raising of chlorine tank No. 2 began at 4:22 p.m. and was in place in cradle barge at 5:20 P.M. and after inspection of valves was in tow to Geismer, La. Coast Guard stopped river traffic at 6:00 A.M. and released river traffic at 5:22 P.M. Considerable concern had been expressed by Mississippi Adjutant General about starting the lift so late that it could not be completed by dark. He had been advised that if lift could not be started shortly after 4:00 P.M. it would be deferred until the following day.

Saturday, October 27

Mississippi National Guard supplied PHS Emergency Operation Headquarters with copies of manual containing all Mississippi Operation Chlorine plans and annexes.

Sunday, October 28

Filming of Operation Chlorine activities by Communicable Disease Center representatives for PHS documentary film was completed.

Arrangements were made for several groups of National Guardsmen to visit barge site since only dredging work was being done.

Monday, October 29

PHS Emergency Operation Headquarters and Army Corps of Engineers staff met with Mississippi Adjutant General to discuss plans in connection with raising the last two tanks. The Adjutant General requested that if raising of a tank was not ready until late in the day, that it be postponed until the following morning. Concurrence on this request was obtained. The Adjutant General requested further that if raising fell on Saturday or Sunday it be delayed until Monday. After considerable discussion, agreement to a possible raising on Saturday

was obtained. In a subsequent meeting with Louisiana State Police, similar agreement was obtained.

Request was received for acquisition of 150 medical tags to be used in the return of chronically ill patients. All local supply of tags had been exhausted.

Tuesday, October 30

Plans were made and a form designed for use by the Mississippi State Board of Health in evaluating the quality of emergency care received and the merits of various transportation methods used. This was to be done by interviewing chronically ill patients upon their return.

List of Federal personnel that had participated in Operation Chlorine was prepared and copies made available.

Discussion was held with Louisiana State Board of Health representative on various monitoring devices that could be used to determine when it was safe to return to area if there was an accidental release of chlorine gas. Statement on recommended procedure was prepared.

Wednesday, October 31

Two representatives from Memphis Army Depot reported to PHS Emergency Operation Headquarters with the mission of assisting in the collection and return transportation of gas masks after the raising of the fourth tank. Major responsibility for collection of masks in Natchez was placed on staff of the local Civil Defense Council with the Fire Department staff collecting masks issued in Vidalia. Details of defraying costs involved in packing and shipping were worked out.

After discussion between Mississippi National Guard and PHS Emergency Operation Headquarters staff, the decision was made to advise school principals not to try to hold school on Saturday if raising of a tank should fall on that day.

Thursday, November 1

PHS Emergency Operation Headquarters staff observed practice exercise of the evacuation of one of the schools in Natchez. The time required from warning to completed loading of the 750 children on school buses and National Guard vehicles was one minute and forty seconds.

Meeting was held of Adams County Health Department, PHS Emergency Operation Headquarters, and Mississippi National Guard staff to finalize plans for the return of chronically ill patients after the fourth tank raising.

Advice received that Coast Guard issued stop order on upriver traffic at 6:00 P.M. and downriver traffic at 11:00 P.M.

Friday, November 2

Lifting of chlorine tank No. 3 began at 8:38 A.M. and the tank was in place on cradle barge at 9:52 A.M. River traffic resumed at 10:00 A.M. Prior to lifting, special alert notice was given to Ferriday officials to have sufficient transportation vehicles available since wind was blowing in that direction. Lifting operation was observed by a U.S. Senator and a U.S. Congressman from Louisiana.

Veterans Administration representatives were alerted that fourth tank would probably be raised on Monday and return of chronically ill patients would be started immediately thereafter.

Saturday, November 3

Representatives from Army Corps of Engineers, PHS Emergency Operation Headquarters, Office of Emergency Planning, Red Cross, Mississippi National Guard, Louisiana State Police, Mississippi and Louisiana State Boards of Health, Adams County Civil Defense Council and Louisiana Area Civil Defense Office met to discuss roll up operations since the raising of the fourth tank was scheduled for Monday morning, November 5 and the state of emergency would be declared ended as soon as tank was in tow down the river. OEP representative stated that Federal funds would be allowed for National Guard operations for a reasonable length of time after the raising of the last tank. Corps of Engineers representative stated that they were responsible for preparing a report covering their activities in Operation Chlorine but were requested to include activities of other military agencies involved. He stated further that activities should be brought to a close as rapidly as possible and that expenditure documentations should be made. A listing was made at the meeting of all Federal and State agencies that had taken film and photographs.

Sunday, November 4

Representatives of PHS Emergency Operation Headquarters met with representatives of Adams County Health Department and Mississippi National Guard to review and obtain concurrence on a schedule prepared for the return of evacuated patients.

Coast Guard advised that stop order on upriver traffic was issued at 6:00 P.M. and downriver traffic at 11:00 P.M.

Monday, November 5

Raising of chlorine tank No. 4 began at 8:27 A.M. and the tank was in the cradle barge at 9:47 A.M. ready for valve inspection prior to tow down the river. Coast Guard released river traffic at 10:10 A.M. The state of emergency in the area was declared terminated at 10:24 A.M.

Representative of Corps of Engineers requested PHS Emergency Operation Headquarters to prepare an estimate of total costs of Federal agencies involved in Operation Chlorine (excluding Army Corps of Engineers and U. S. Coast Guard). After discussing the unreliability of present fiscal information and making it clear that these estimates would not be at all binding, it was agreed to prepare gross estimate calculations.

Twenty-three Mississippi chronically ill patients were returned - 14 by ambulance, 9 by helicopter. Louisiana returned 15 patients by ambulance, police bus and private car.

Dissemination of radio and newspaper information on return of gas masks was started.

The President determined under P.L.875 that the potential hazard to health and safety, in those areas in the State of Louisiana located in the vicinity of the barge, threatened to be of sufficient severity and magnitude to warrant Federal disaster assistance.

Tuesday, November 6

Representative of Corps of Engineers advised PHS Emergency Operation Headquarters that several reimbursement vouchers from other Federal agencies had been received in Vicksburg and were being submitted to Public Health Service for processing. He was advised that mechanics for handling Federal agency reimbursement would be resolved by the Office of Emergency Planning.

Comments were made on article prepared by Corps of Engineers for an Army publication.

Plans were developed for the preparation of appreciation letters and certificates by the Public Health Service for issuance to key people involved in Operation Chlorine.

Mississippi National Guard returned 125 Mississippi chronically ill patients - 90 by airplane, 31 by bus, and 4 by ambulance.

Wednesday, November 7

Mississippi Air National Guard returned 39 Mississippi and 26 Louisiana chronically ill patients by airplane. Five additional Louisiana patients returned by ambulance.

Thursday, Novemb.. 8

Mississippi Air National Guard returned the last of the Mississippi chronically ill patients by airplane - a total of 52. Mississippi reported that four patients expired during the period of evacuation, one left the hospital in the care of relatives and two remained in a Natchez hospital. Louisiana reported one patient expired during the period of evacuation and five patients were transferred to a charity hospital for further hospitalization.

PHS Emergency Operation Headquarters was closed.

Figure 18. Chronically ill and handicapped patients being received at a VA Hospital.

THE WHITE HOUSE

WASHINGTON

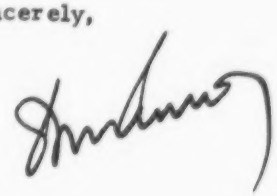
November 13, 1962

Dear Mr. Secretary:

Having followed the problem closely since its inception, I was pleased to learn from the Director of the Office of Emergency Planning of the successful raising of the last chlorine gas cylinder from the sunken barge in the Mississippi River near Natchez.

The safe elimination of this unique and unprecedented hazard to citizens in the potentially affected area was accomplished through the closely coordinated and cooperative efforts of a number of Federal Departments and Agencies. The Public Health Service and other elements of your Department made an outstanding contribution to the project. I will be pleased to have you express my gratitude to those members of your Department who participated in this successful effort. It is a tribute to all involved that the sunken cylinders were raised without loss of life or injury to any person.

Sincerely,



Honorable Anthony J. Celebrezze
Secretary of Health, Education
and Welfare
Washington 25, D.C.

EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF EMERGENCY PLANNING

WASHINGTON, D. C.

OFFICE OF THE DIRECTOR

November 6, 1962

Dear Mr. Secretary:

The successful raising of the last chlorine gas cylinder from the sunken barge in the Mississippi River was accomplished yesterday morning, thereby eliminating the grave hazard to citizens in the potentially affected area.

As all associated with this effort realize, this was a unique situation posing the threat of a disaster of great proportions. The cooperation and team work which characterized the relationship between Federal and State elements resulted in the elimination of the hazard without loss of life or injury to any person.

I wish to express my gratitude to you, Boisfeuillet Jones, Dr. Hugh Cottrell and the many others in the Department of Health, Education and Welfare who were so willing and so helpful. The Office of Emergency Planning received outstanding cooperation and support at all levels within your organization.

With best personal regards, I am

Sincerely,

Edward A. McDermott

Honorable Anthony J. Celebrezze
Secretary of Health, Education and Welfare
Washington 25, D. C.

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